August 1, 2001

IBM

United States

# configuration and options guide

eserver xSeries Servers

Netfinity Servers

Storage Enclosures

Fibre Channel Solutions

Options

eserver PROVEN

ibm.com/pc/us/eserver/xseries/library

# Table of Contents



Information Sources ..... 2

Server Product Positioning ..... 6

IBM xSeries and Netfinity® Selection Guide ..... 8

IntelliStation® M Pro (dual processor) ..... 12

IntelliStation R Pro ..... 18

IntelliStation Z Pro ..... 22

Appliance Servers ..... 26

IBM xSeries 200 ..... 46

IBM xSeries 220 ..... 54

IBM xSeries 230 and Netfinity 5100 ..... 62

IBM xSeries 232 ..... 70

IBM xSeries 240 and Netfinity 5600 ..... 78

IBM xSeries 250 ..... 86

IBM xSeries 300 ..... 96

IBM xSeries 330 ..... 104

IBM xSeries 340 and Netfinity 4500R ..... 114

IBM xSeries 342 ..... 122

IBM xSeries 350 ..... 130

IBM xSeries 370 ..... 138

IBM External Storage Expansion Unit Overview ..... 147

FAStT200 Storage Server (3542xRU) ..... 148

IBM EXP300 (35311RU) ..... 150

IBM FAStT EXP500 (35601RU) ..... 154

Fibre Array Solutions ..... 156

High Availability and Scalable Cluster Solutions ..... 164

IBM Datacenter Solutions ..... 168

IBM Netfinity NetBAY3/NetBAY3E™ Stackable Enclosures ..... 174

Rack Cabinets and Options ..... 176

NetBAY Rack Power Configurator ..... 182

Appendix A: Tape Drive Attributes ..... 186

Appendix B: Tape Library Attributes ..... 188

Appendix C: UPS Runtime Estimate (minutes) ..... 190

Appendix D: SCSI Cables - Storage Units - Controllers ..... 192

Appendix E: IBM Serial I/O ..... 193

Important Notes ..... 194

# Information Sources

| Canada | | |
|---|---|---|
| **Audience** | **Where to go** | **How to get** |
| **IBM xSeries Configuration and Options Guide** | | |
| Customers | www.pc.ibm.com/ca/eserver/xseries/index.shtml | |
| Business Partners | www.pc.ibm.com/partner/ca | Select “Sales Tools” and then “Marketing Essentials.” User ID and Password required. |
| IBM Employees | Marketing Essentials | By Brand category --> IBM Netfinity or By Brand category --> PC Configurator |
| Feedback | www.pc.ibm.com/partner/ca/feedback.html | |
| **IBM xSeries and Netfinity Rack Configurator** | | |
| Customers | www.pc.ibm.com/ca/eserver/xseries/index.shtml | |
| Business Partners | www.pc.ibm.com/partner/ca | Select “Sales Tools” and then “Marketing Essentials.” User ID and Password required. |
| IBM Employees | Marketing Essentials | By Brand category --> IBM Netfinity or By Brand category --> PC Configurator |
| Feedback | ibm_netfinity_rack_configurator@vnet.ibm.com | E-mail |
| **PCSales Guide/Configurator and WorkPad Pricer (Updated weekly or biweekly)** | | |
| Customers | www.can.ibm.com/config | Download PSC-NA1 and PSC-NA2 |
| Business Partners | www.pc.ibm.com/partner/ca/ | Download PSC-NA1 and PSC-NA2, 3 or 4<br>User ID and Password required |
| IBM Employees | PartnerNEWS | Configurator, PSC-NA1 and PSC-NA2, 3 or 4 |
| Feedback | bburgess@ca.ibm.com | E-mail |
| **Latest Product & Technical Information** | | |
| Customers | www.pc.ibm.com/ca/eserver/xseries/index.shtml | |
| Business Partners | www.pc.ibm.com/partner/ca or call the PSMT | User ID and Password required |
| IBM Employees | Marketing Essentials | By Brand category --> IBM Netfinity or By Brand category --> PC Configurator |
| **Latin America** | | |
| **IBM xSeries Configuration and Options Guide** | | |
| Customers | www.pc.ibm.com/us/eserver/xseries/library | Select “Configuration Tools” |
| Business Partners | Marketing Essentials in ePartner | See footnote 2 |
| IBM Employees | Marketing Essentials in Lotus Notes PartnerInfo | By Brand category --> IBM Netfinity or By Brand category --> PC Configurator |
| Feedback | laconfig@us.ibm.com | E-mail |
| **IBM xSeries and Netfinity Rack Configurator** | | |
| Customers | www.pc.ibm.com/us/eserver/xseries/library | Select “Configuration Tools” |
| Business Partners | Marketing Essentials in ePartner | See footnote 2 |
| IBM Employees | Marketing Essentials in PartnerInfo | By Brand category --> IBM Netfinity or By Brand category --> PC Configurator |
| Feedback | ibm_netfinity_rack_configurator@vnet.ibm.com | E-mail |
| **OrderBUILDER[1] (updated weekly)** | | |
| Business Partners | Marketing Essentials in ePartner | See footnote 2 |
| IBM Employees | Marketing Essentials in PartnerInfo | By Brand category --> IBM Netfinity or By Brand category --> PC Configurator |
| Feedback | laconfig@us.ibm.com | E-mail |
| **Latest Product & Technical Information** | | |
| Customers | www.pc.ibm.com/la | |
| Business Partners | www.pc.ibm.com/la/ or www.pc.ibm.com/br | See footnote 2 |
| IBM Employees | Marketing Essentials in PartnerInfo | By Brand category --> IBM Netfinity or By Brand category --> PC Configurator |

1. OrderBUILDER has features that are unique to a geographical region and should be downloaded from a source intended for use in that region.
2. ID and Password required. Spanish==>www.pc.ibm.com/la. Select Partner World/VAR 2000. Then select either PartnerWorld or VAR2000 and request an ID and Password. Brazil==> www.pc.com/br/. Select PartnerWorld and then Formulario de Cadastramento. If you have an ID/Password, Spanish==> www.pc.ibm.com/la/. Select PartnerWorld/ VAR2000. Then select Marketing Essentials, then PC Configurator. Brazil==> www.pc.ibm.com/br/. Select PartnerWorld and then Marketing Essentials.

***See Next Page for United States and Additional URLs***

## United States

| Audience | Where to go | How to get |
|---|---|---|
| **IBM xSeries Configuration and Options Guide** | | |
| Customers | www.pc.ibm.com/us/eserver/xseries/library | Select "Configuration Tools" |
| Business Partners | www.pc.ibm.com/partner/us/ | Select Marketing Essentials > PC Configurator > Server Paper Configurator. User ID and Password required. |
| IBM Employees | Marketing Essentials | By Brand category --> IBM Netfinity --> Configurators or<br>By Brand category --> PC Configurator |
| Feedback | www.pc.ibm.com/partner/us/feedback.html | |
| **IBM xSeries and Netfinity Rack Configurator** | | |
| Customers | www.pc.ibm.com/us/eserver/xseries/library | Select "Configuration Tools" |
| Business Partners | www.pc.ibm.com/partner/us/ | Select Sales Tools, then Marketing Essentials, then IBM PC Server--> Rack Configurator. User ID and Password required. |
| IBM Employees | Marketing Essentials | By Brand category --> IBM Netfinity or By Brand category --> PC Configurator |
| Feedback | ibm_netfinity_rack_configurator@vnet.ibm.com | E-mail |
| **OrderBUILDER[1] (updated bi-weekly)** | | |
| Customers | www.pc.ibm.com/us/orderbuilder | |
| Business Partners | www.pc.ibm.com/partner/us | Select Sales Tools, then OrderBUILDER. User ID and Password required. |
| IBM Employees | Marketing Essentials | By Brand category --> IBM Netfinity or By Brand category --> PC Configurator |
| Feedback | pcconfig@us.ibm.com | E-mail |
| **Latest Product & Technical Information** | | |
| Customers | www.pc.ibm.com/us/eserver/xseries<br>or call 1-800-772-2227 | |
| Business Partners | www.pc.ibm.com/partner/us/ or call 1-800-426-7763 | Select Products & Services; User ID and Password required |
| IBM Employees | Marketing Essentials | By Brand category --> IBM Netfinity or By Brand category --> PC Configurator |

## Additional URLs

| Audience | Where to go | How to get |
|---|---|---|
| Technical spec sheets (PSREF) | www.ibm.com/us/eserver/xseries/library | Select "Technical spec sheets (PSREF)" |
| IBM Datacenter Solutions | www.developer.ibm.com/xseries/index.html | Under "News" select "Solutions Library." Under "Most Popular Solutions" select "Windows 2000 Datacenter Server" |
| Clustering (US, LA) | www.pc.ibm.com/ww/eserver/xseries/clustering/index.html | Select desired category or Server |
| Clustering (CAN) | www.pc.ibm.com/ww/eserver/xseries/clustering/index.html | Select desired category or Server |
| Benchmark Results | www.pc.ibm.com/ww/eserver/xseries/benchmarks/ | Select desired category or Server |
| Options/NOS/Server compatibility | www.pc.ibm.com/us/compat | From pulldown select desired category |
| NOS - Hot-Plug/Failover Support | www.pc.ibm.com/us/compat | From pulldown select "Netfinity Hotplug PCI and Failover Info." |
| IBM Storage Products | www.storage.ibm.com | |
| Adobe® Acrobat® Reader V 3.0 or 4.0 | www.adobe.com/products/acrobat/readstep.html | Follow instructions. |
| Adv Sys Mgmt Adapter Firmware | www.pc.ibm.com/ww/eserver/xseries | Select Support and Downloads, server brand, Hardware Drivers (Fixes menu), family, model, then Advanced Systems Management in the Downloadable Files menu. |
| Flash BIOS Updates | www.pc.ibm.com/ww/eserver/xseries | Select Support and Downloads, server brand, Hardware Drivers BIOS (Fixes menu), family, model, then BIOS in the Downloadable Files menu. |
| ServeRAID™ Updates | www.pc.ibm.com/ww/eserver/xseries | Select Support and Downloads, server brand, then ServeRAID drivers in the Fixes menu. |

1. OrderBUILDER has features that are unique to a geographical region and should be downloaded from a source intended for use in that region.



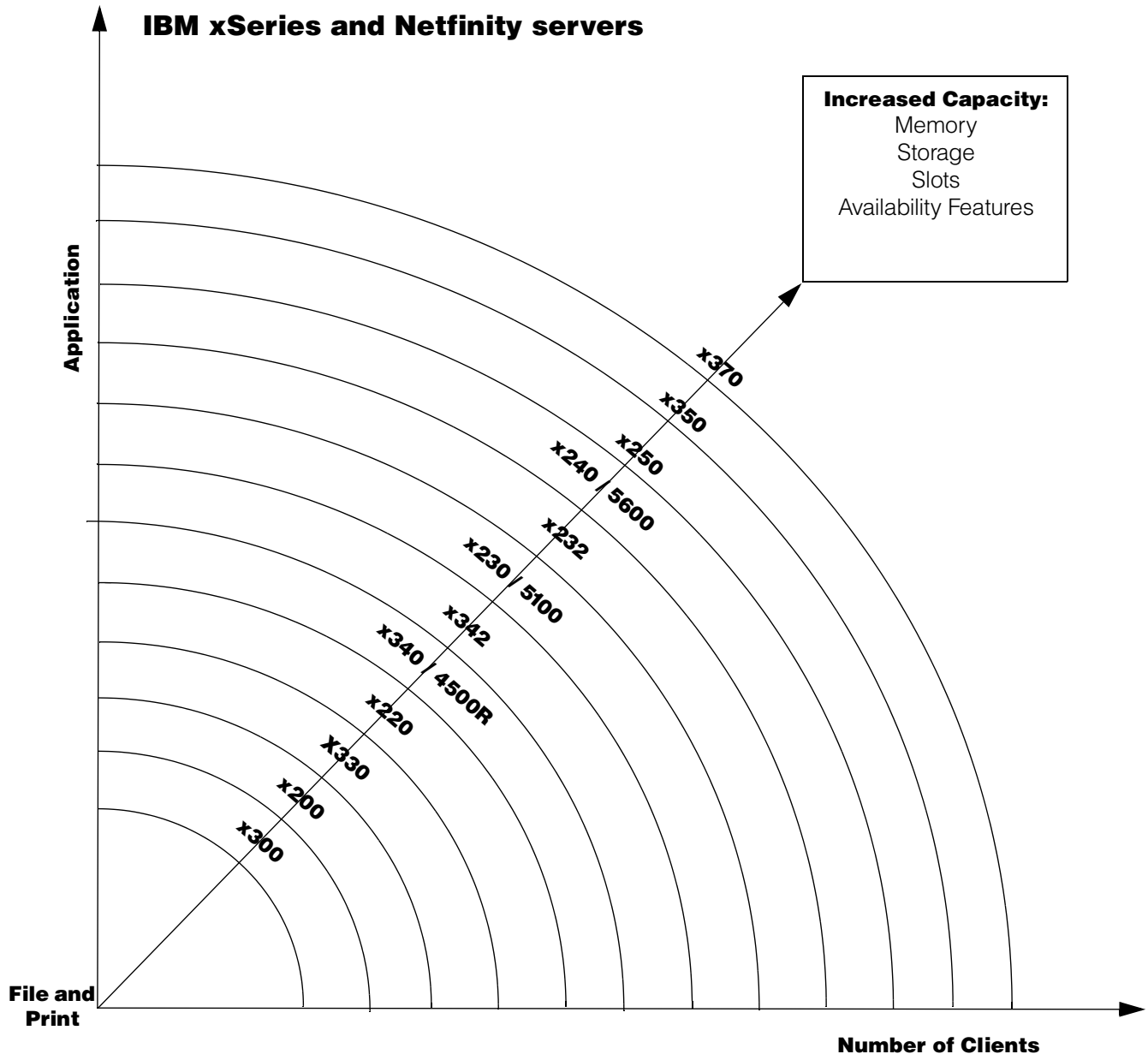
The information contained in this document has not been submitted to any formal IBM test. The following paragraph does not apply to the United Kingdom or any country where any such provisions are inconsistent with local law:

INTERNATIONAL BUSINESS MACHINES CORPORATION PROVIDES THIS PUBLICATION "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. SOME STATES DO NOT ALLOW DISCLAIMER OF EXPRESS OR IMPLIED WARRANTIES IN CERTAIN TRANSACTIONS. THEREFORE, THIS STATEMENT MAY NOT APPLY TO YOU. THERE IS NO GUARANTEE THAT IBM WILL MARKET ANY PARTICULAR PRODUCT IN YOUR COUNTRY.

The use of this information or the implementation of any of these techniques is a customer responsibility and depends on the customer's ability to evaluate and integrate them into the customer's operational environment. While each item may have been reviewed by IBM for accuracy in a specific situation, there is no guarantee that the same or similar results will be obtained elsewhere. Customers attempting to adapt these techniques to their own environments do so at their own risk.

The following sample configurations are for illustration only and may not be suitable for any specific customer installation. Contact your IBM Business Partner or IBM Marketing Representative for assistance with your specific configuration requirements.

# Server Product Positioning



When in a competitive situation, this table suggests the appropriate IBM xSeries or Netfinity server to bid against other vendors' equipment. However, as an IBM business partner, you may determine that customer-specific requirements may make an alternative IBM solution a better choice

| | Value | Price Performance | Mission Critical | Rack Optimized |
|---|---|---|---|---|
| **8-way** | | | **IBM**: xSeries 370<br>**Compaq**: ProLiant 8000, ML750<br>**Dell**: No Offering<br>**HP**: NetServer LH 6000, LT6000R | **IBM**: xSeries 370<br>**Compaq**:ProLiant 8500<br>**Dell**: PowerEdge 8450<br>**HP**: NetServer LXr 8000 |
| **4-way** | | **IBM**: xSeries 250<br>**Compaq**: ProLiant ML570<br>**Dell**: PowerEdge 6400<br>**HP**: NetServer LH4 | **IBM**: xSeries 250<br>**Compaq**: No Offering<br>**Dell**: No Offering<br>**HP**: NetServer LXr 8000 | **IBM**: xSeries 350<br>**Compaq**: ProLiant DL580<br>**Dell**: PowerEdge 6450<br>**HP**: NetServer LH4r |
| **2-way** | **IBM**: xSeries 220<br>**Compaq**: ProLiant ML350<br>**Dell**: PowerEdge 1300<br>**HP**: NetServer E60 | **IBM**: xSeries 230 / Netfinity 5100, xSeries 232<br>**Compaq**: ProLiant ML370<br>**Dell**: PowerEdge 2400<br>**HP**: NetServer LC2000 | **IBM**: xSeries 240 / Netfinity 5600<br>**Compaq**: ProLiant ML530<br>**Dell**: PowerEdge 4400<br>**HP**: NetServer LH 3000 | **IBM**: xSeries 330, xSeries 340/ Netfinity 4500R, xSeries 342<br>**Compaq**: ProLiant DL380, DL360<br>**Dell**: PowerEdge 2450<br>**HP**: NetServer LPr |
| **Uni** | **IBM**: xSeries 200<br>**Compaq**: ProLiant ML330<br>**Dell**: No Offering<br>**HP**: No Offering | | | **IBM**: xSeries 300<br>**Compaq**: ProLiant DL320<br>**Dell**: PowerEdge 350<br>**HP**: NetServer LPr |

# IBM xSeries and Netfinity® Selection Guide

This graph represents general guidelines for selecting the appropriate server based on the number of users that can be supported in a particular application environment. This chart is for general guidance since each customer environment is unique and is unlikely to be precisely represented by any of the specific applications in the chart, but by using the chart, a reasonable approximation can be derived. External Storage Units are utilized when internal capacities are exceeded. Utilize the chart by following the steps outlined on the following page.
These are not published benchmark results. Access www.pc.ibm.com/ww/eserver/xseries/benchmarks/index.html to obtain the benchmark data.

| Application/ Expectation of Maximum # of Users | | xSeries 200 Uni-Pentium® III 1GHz/256KB | xSeries 220 Dual Pentium III 1GHz/256KB | xSeries 300 Uni-Pentium III 1GHz/256KB | xSeries 330 Dual Pentium III 1GHz/256KB |
|---|---|---|---|---|---|
| **DB Transaction Processing** Select, Update and Delete; Does not include image or Decision Support | **# Users** | **1500** | **1970** | **1500** | **2110** |
| | # Processors | 1 | 2 | 1 | 2 |
| | Memory | 1.5GB | 2GB | 1.5GB | 2GB |
| | # Hard Disk Drives | 12 to 18 | 40 to 50 | 12 to 20 | 36 to 48 |
| | # RAID Adapters | ≥1 | ≥2 | 1 | ≥2 |
| | # Network Connections | 1 | 1 | 1 | 1 |
| **File and Print** Application is stored locally. (For server stored applications - cut number of users in half). | **# Users** | **800** | **1000** | **800** | **2100** |
| | # Processors | 1 | 2 | 1 | 2 |
| | Memory | 1. 5GB | 2GB | 1.5GB | 2GB |
| | # Hard Disk Drives | 5 to 10 | 4 to 8 | 5 to 10 | 20 to 30 |
| | # RAID Adapters | ≥1 | 1 | 1 | 1 to 2 |
| | # 100Mbps Ethernet Connections | ≥2 | 2 | 2 | 4 |
| **Lotus® Notes®** 10% Power Users 40% Mail 50% Mail & DB | **# Users** | **900** | **1180** | **900** | **1950** |
| | # Processors | 1 | 1 | 1 | 2 |
| | Memory | 1.5GB | 2GB | 1.5GB | 2GB |
| | # Hard Disk Drives | 5 to 10 | 10 to15 | 5 to 10 | 20 to 30 |
| | # RAID Adapters | ≥1 | 1 | 1 | 1 to 2 |
| | # Network Connections | ≥1 | ≥2 | ≥2 | ≥2 |
| **Microsoft® Exchange Server 2000** 100% Med Usersl 30MB Mailbox | **# Users** | **1600** | **3750** | **1600** | **5000** |
| | # Processors | 1 | 2 | 1 | 2 |
| | Memory | 1GB | 1GB | 1GB | 2GB |
| | # Hard Disk Drives | 9 | 10 | 10 to 14 | 10 |
| | # RAID Adapters | 1 | ≥1 | 1 | 1 |
| | # Network Connections | ≥1 | ≥1 | ≥2 | ≥2 |
| **SAP 3-Tier Distributed Ver 4.0b Processing** Sales and Distribution Application (Minimum of 16-20 Servers) | **# Users** | - | - | - | - |
| | # Processors | - | - | - | - |
| | Memory | - | - | - | - |
| | # Hard Disk Drives | - | - | - | - |
| | # RAID Adapters | - | - | - | - |
| | # Network Connections | - | - | - | - |
| **SAP Central Version 4.0b Processing** Sales and Distribution Application (One Server) | **# Users** | **75** | **80** | **75** | **160** |
| | # Processors | 1 | 1 | 1 | 2 |
| | Memory | 1GB | 1GB | 1GB | 1GB |
| | # Hard Disk Drives | 12 | 12 | 12 | 12 to 24 |
| | # RAID Adapters | ≥1 | ≥1 | ≥1 | ≥1 |
| | # Network Connections | 1 | 1 | 1 | 1 |
| **High Availability Features** | Hot-Swap HDD Bays | - | - | - | X |
| | Hot-Plug PCI Slots | - | - | - | - |
| | Hot-Swap Power | - | - | - | - |
| | Hot-Swap Fans | - | - | - | - |
| | RAID | Opt | Opt | Opt | Opt |
| | Clustering Support | - | - | - | - |
| | Sys Mgt Processor | - | Opt | - | - |
| **Other Distinquishing Features** | Max # Processors | 1 | 2 | 1 | 2 |
| | Max Memory | 1.5GB | 4GB | 1.5GB | 4GB |
| | Max Int Storage | 293.6GB[2] | 293.6GB | 72.8GB | 146.8GB |
| | Max Int Storage with Int Tape Drive | 293.6GB | 293.6GB | - | - |
| | Available PCI Slots | 5 | 5 | 1 | 2 |
| | 19in Rack Models | - | - | X | X |
| | NetBAY3x Support | - | - | - | - |

# IBM xSeries and Netfinity Selection Guide

| Application/ Expectation of Maximum # of Users | | xSeries 340 / Netfinity 4500R Dual Pentium III 1GHz/ 256KB | xSeries 342 Dual Pentium III 1.13GHz/ 512KB | xSeries 230 / Netfinity 5100 Dual Pentium III 1GHz/ 256KB | xSeries 232 Dual Pentium III 1.13GHz/ 512KB | xSeries 240 / Netfinity 5600 Dual Pentium III 1GHz/ 256KB | xSeries 250 Quad Pentium III Xeon 900MHz[1]/ 2MB | xSeries 350 Quad Pentium III Xeon™ 900MHz/2MB | xSeries 370 Eight-Way Pentium III Xeon 900MHz/ 2MB |
|---|---|---|---|---|---|---|---|---|---|
| **DB Transaction Processing** Select, Update and Delete; Does not include image or Decision Support | **# Users** | **2530** | **3570** | **2530** | **3570** | **2530** | **7030** | **7030** | **11300** |
| | # Processors | 2 | 2 | 2 | 2 | 2 | 4 | 4 | 8 |
| | Memory | 4GB | 4GB | 4GB | 4GB | 4GB | 4GB | 4GB | 4GB |
| | # Hard Disk Drives | 30 to 50 | 50 to 70 | 30 to 50 | 50 to 70 | 30 to 50 | 80 to 140 | 80 to 140 | 180 to 250 |
| | # RAID Adapters | ≥2 | ≥2 | ≥4 | ≥2 | ≥4 | ≥4 | ≥4 | ≥5 or Fibre |
| | # Network Connections | 1 to 2 | 1 to 2 | 1 to 2 | 1 to 2 | 1 to 2 | 2 to 3 | 2 to 3 | 2 to 3 |
| **File and Print** Application is stored locally. (For server stored applications cut number of users in half). | **# Users** | **2100** | **2300** | **2100** | **2300** | **2100** | **5000** | **5000** | **6000** |
| | # Processors | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 3 to 4 |
| | Memory | 2GB | 2GB | 2GB | 2GB | 2GB | 2 to 4GB | 2 to 4GB | 4GB |
| | # Hard Disk Drives | 20 to 30 | 20 to 30 | 20 to 30 | 20 to 30 | 20 to 30 | 50 to 90 | 50 to 90 | 75 to 150 |
| | # RAID Adapters | 1 to 2 | 1 to 2 | 1 to 2 | 1 to 2 | 1 to 2 | ≥4 | ≥4 | ≥4 or Fibre |
| | # 100Mbps Ethernet Connections | 4 | 4 or 1Gb | 4 | 4 or 1Gb | 4 | 8 | 8 | 10 |
| **Lotus Notes** 10% Power Users 40% Mail 50% Mail & DB | **# Users** | **2200** | **3100** | **2200** | **3100** | **2200** | **4615** | **4615** | **7335** |
| | # Processors | 2 | 2 | 2 | 2 | 2 | 4 | 4 | 8 |
| | Memory | 2 to 3GB | 3GB | 2 to 3GB | 3GB | 2 to 3GB | 3GB | 3GB | 4GB |
| | # Hard Disk Drives | 20 to 30 | 20 to 30 | 20 to 30 | 20 to 30 | 20 to 30 | 20 to 30 | 20 to 30 | 30 to 40 |
| | # RAID Adapters | 1 to 2 | 1 to 2 | 1 to 2 | 1 to 2 | 1 to 2 | 2 to 3 | 2 to 3 | ≥3 |
| | # Network Connections | ≥2 | ≥3 | ≥2 | ≥3 | ≥2 | ≥3 | ≥3 | ≥4 |
| **Microsoft Exchange Server2000** 100% Med Users 30MB Mailbox | **# Users** | **4500** | **5250** | **4000** | **5250** | **4250** | **7250** | **8000** | **9000** |
| | # Processors | 2 | 2 | 2 | 2 | 2 | 4 | 4 | 8 |
| | Memory | 2GB | 4GB | 2GB | 4GB | 2GB | ≥3GB | 3GB | 4GB |
| | # Hard Disk Drives | 9 | 6 | 12 | 9 | 12 | 30 to 40 | 30 | 40 to 50 |
| | # RAID Adapters | 1 | 1 | 1 | 1 | 2 | ≥2 | 2 | ≥3 |
| | # Network Connections | ≥1 | ≥1 | ≥1 | ≥1 | ≥1 | ≥2 | ≥2 | ≥2 |
| **SAP 3-Tier Distributed Ver 4.x Processing** Sales and Distribution Application (Minimum of 16-20 Servers) | **# Users** | **-** | **-** | **2790** | **-** | **2800** | **4000** | **4000** | **6400** |
| | # Processors | - | - | 2 | - | 2 | 4 | 4 | 8 |
| | Memory | - | - | 1 to 2GB | - | 1 to 2GB | ≥4GB | ≥4GB | ≥4GB |
| | # Hard Disk Drives | - | - | 24 to 36 | - | 24 to 36 | 48 to 60 | 48 to 60 | 48 to 60 |
| | # RAID Adapters | - | - | ≥2 | - | ≥2 | ≥3 | ≥3 | ≥3 |
| | # Network Connections | - | | 1 | - | 1 | 1 | 1 | 1 |
| **SAP Central Version 4.x Processing** Sales and Distribution Application (One Server) | **# Users** | **160** | **-** | **162** | **-** | **180** | **300** | **300** | **480** |
| | # Processors | 2 | - | 2 | - | 2 | 4 | 4 | 8 |
| | Memory | 1GB | - | 1 to 2GB | - | 1 to 2GB | ≥2GB | ≥2GB | ≥4GB |
| | # Hard Disk Drives | 12 to 24 | - | 12 to 24 | - | 12 to 24 | 24 to 36 | 24 to 36 | 24 to 36 |
| | # RAID Adapters | ≥1 | - | ≥1 | - | ≥1 | ≥2 | ≥2 | ≥2 |
| | # Network Connections | 1 | - | 1 | - | 1 | 1 | 1 | 1 |
| **High Availability Features** | Hot-Swap HDD Bays | X | X | X | X | X | X | X | X |
| | Hot-Plug PCI Slots | - | - | - | - | X | X | X | X |
| | Hot-Swap Power | X | X | Opt | X | X | X | X | X |
| | Hot-Swap Fans | X | X | - | - | X | X | X | X |
| | RAID | Opt | Opt | Opt | Opt | Opt | Opt | Opt | Opt |
| | Clustering Support | X | X | X | X | X | X | X | X |
| | Sys Mgt Processor | X | X | X | X | X | X | X | X |
| **Other Distinquishing Features** | Max # Processors | 2 | 2 | 2 | 2 | 2 | 4 | 4 | 8 |
| | Max Memory | 4GB | 4GB | 4GB | 4GB | 4GB | 16GB | 16GB | 32GB |
| | Max Int Storage | 440.4GB | 440.4GB | 440.4GB | 660.6GB | 440.4GB | 734GB | 440.4GB | 146.8GB |
| | Max Int Storage with Int Tape Drive | 220.2GB | 220.2GB | 440.4GB | 660.6GB | 440.4GB | 734GB | - | - |
| | Available PCI Slots | 5 | 5 | 5 | 5 | 5 | 6 | 6 | 12 |
| | 19in Rack Models | X | X | X | X | X | X | X | X |
| | NetBAY3x Support | - | - | - | - | - | X | - | X[3] |

1. MHz only measures microprocessor internal clock speed, not application performance. Many factors affect application performance.
2. When referring to hard disk drive capacity, GB equals one billion bytes. Total user accessible capacity may vary depending on operating environments.
3. With a Rack-to-Tower Conversion Kit installed.

### Procedure for Server Selection Guidance Chart

File and Print numbers are Novell Netware-based with all others based on Microsoft Windows NT®. Other Network Operating System (NOS) results could vary.
Extensive SAP sizings are available from IBM/SAP Competency Centers. Contact your IBM Marketing Representative for additional information**.**
**Step 1**: Determine which application (row) most closely represents the customer's environment.
**Step 2**: Move from left to right along the row (chosen in Step 1) noting which columns contain numbers that are equal to or greater than the maximum customer's planned number of users.
**Step 3**: Move up the columns (chosen in Step 2) to the top row to determine which IBM xSeries or Netfinity servers should be considered as possible solutions.
**Step 4**: Evaluate other features such as storage, memory capacity, high availability components, number of available expansion slots, etc., which are unique to each server, in order to determine which is the most appropriate to recommend.
For your reference, configuration information corresponding to the number of users is also provided.

# IntelliStation® M Pro (dual processor)

| Part Number | Processor Speed (MHz)[2] | Number of Processors (Std/Max) | L2 ECC Cache (KB) | Memory (Std/Max) | Video Adapter | Form Factor | Onboard Ethernet (Mbps) | SCSI Controller (Dual, Ultra, RAID) | Removable Media Bays (Total/Avail) | Internal Hard Disk Drive (Std/Max) | CD-ROM (IDE)[6] | Bays (Total/Avail) | Slots (Total/Avail) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **IntelliStation M Pro (dual processor) At-A-Glance** | | | | | | | | | | | | | |
| 6850-10U[1] | 1.5GHz | 1/2 | 256 | 256MB/4GB | Matrox Millennium G450 | Tower | 10/100 | IDE[3] | 3/1 | 40GB/ 160GB[4] | 48X-20X | 9/6 | 6/5 |
| 6850-20U[1] | 1.7GHz | 1/2 | 256 | 256MB/4GB | Matrox Millennium G450 | Tower | 10/100 | IDE[3] | 3/1 | 40GB/ 160GB[4] | 48X-20X | 9/6 | 6/5 |
| 6850-21U[1] | 1.7GHz | 1/2 | 256 | 256MB/4GB | Matrox Millennium G450 | Tower | 10/100 | U160[3] | 3/1 | 18.2GB/ 440.4GB[5] | 48X-20X | 9/6 | 6/5 |
| 6850-22U[1] | 1.7GHz | 1/2 | 256 | 512MB4GB | NVIDIA Quadro2 Pro | Tower | 10/100 | U160[3] | 3/1 | 18.2GB/ 440.4GB[5] | 48X-20X | 9/6 | 6/5 |
| 6850-25U[1] | 1.7GHz | 1/2 | 256 | 512MB4GB | Fire GL4 | Tower | 10/100 | U160[3] | 3/1 | 18.2GB/ 440.4GB[5] | 48X-20X | 9/6 | 6/4 |

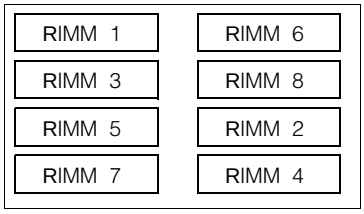
1. IntelliStation M Pro ships with a keyboard and mouse. See "Power, Monitors and Accessories" for a list of compatible monitors. Tower models are rack-mountable using an optional tower-to-rack conversion kit, or they can be turned on the side and installed as desktop units capable of supporting the weight of a monitor.
2. Intel Xeon™ processor with advanced transfer ECC L2 cache and 4 X 100MHz Front Side Bus (FSB).
3. All models include an integrated ATA-100 IDE controller that supports up to four IDE devices (four HDDs or three IDE HDDs and one CD-ROM) in IDE models and an integrated Ultra160 SCSI controller with one internal and one external port. Both ports are 68-pin, 16-bit Ultra160 (LVD) connectors. The external port supports external Ultra160 SCSI storage devices and the internal port supports up to six SCSI HDDs in SCSI models. Mixing of IDE and SCSI HDDs is not supported.
4. IDE models include a two-drop ATA-100 IDE cable and a two-drop ATA-33 cable. One connector of the ATA-33 cable is attached to the standard CD-ROM and the other connector can be used for an IDE HDD. The CD-ROM must be disconnected to support four IDE HDDs.
5. Requires replacement of the standard 18.2GB 10,000RPM HDD with a 73.4GB HDD.
6. Variable read rate. Actual playback speed will vary and is often less than the maximum possible.

**IntelliStation M Pro (dual processor) Processors**

| Part Number | Processor Upgrades | SMP Support[1] | Processor Speed Upgrade[2] |
|---|---|---|---|
| 24P8401 | 1.5GHz/100MHz 256KB Cache Second Processor for 6850 | 10U | - |
| 24P8402 | 1.7GHz/100MHz 256KB Cache Second Processor for 6850 | 20 … 25U | 10U |

1. One additional processor may be installed, providing a maximum of two. All processors must be identical in type, speed, and cache size.
2. Requires removal of the standard processor. A maximum of two processors may be installed. All processors must be identical in type, speed and cache size. Upgrades may require a BIOS update. To obtain the latest Flash BIOS, access www.pc.ibm.com/support and enter machine "Type-Model" in Quick Path. Select "Downloadable files" then "BIOS."

## IntelliStation M Pro (dual processor) Memory




| Part Number | Memory Description[1] |
|---|---|
| 33L3350 | 128MB PC800 4D ECC RDRAM RIMM (288Mb) |
| 33L3352 | 256MB PC800 8D ECC RDRAM RIMM (288Mb) |
| 33L3354 | 512MB 800MHz ECC 16D RDRAM RIMM Memory (288Mb) |
| 20L0275 | 128MB 800MHz ECC 16D RDRAM RIMM Memory (144Mb) |
| 20L0277 | 256MB 800MHz ECC 16D RDRAM RIMM Memory (144Mb) |

1. Memory RIMMs must be installed in pairs using the same option part number according to the following order: RIMM connectors one and two, three and four, five and six, and seven and eight.

| Total System Memory[1] | | Quantity of RIMMs Added | | |
|---|---|---|---|---|
| 256MB (2 x 128) Models | 512MB (2 x 256) Models | 128MB 33L3350 or 20L0275 | 256MB 33L3352 or 20L0277 | 512MB 33L3254 |
| 512MB | 768MB | 2 | - | - |
| 768MB | 1024MB | 4 | - | - |
| 1024MB | 1280MB | 6 | - | - |
| 1280MB | 1536MB | 4 | 2 | - |
| 1792MB | 2048MB | 4 | - | 2 |
| 2304MB | 2560MB | - | 4 | 2 |
| 2560MB | 2816MB | 2 | - | 4 |
| 2816MB | 3072MB | - | 2 | 4 |
| 3328MB | 3584MB | - | - | 6 |
| 4GB (max)[2] | 4GB (max)[2] | - | - | 8 |

This table does not represent all possible memory configurations. Memory modules may vary in price per MB. Selection of smaller RIMMs may provide a more cost-effective alternative to using larger RIMMs.
1. Network operating systems may limit the maximum amount of addressable memory. See operating system specifications for further information.
2. Requires replacing the standard RIMM.

## IntelliStation M Pro (dual processor) Hard Disk Drive (HDD) Storage

| SCSI Models | | | | |
|---|---|---|---|---|
| Total Int Storage[1] | 10,000RPM HDDs | | | 15,000RPM HDDs |
| | 18.2GB 00N8208 | 36.4GB 00N8209 | 73.4GB 06P5752 | 18.2GB 19K0658 |
| 18.2GB | (Standard on SCSI models) | | | |
| 36.4GB | 1 | - | - | 1 |
| 54.6GB | 2 | - | - | 2 |
| 72.8GB | 3 | - | - | 3 |
| 91GB | 4 | - | - | 4 |
| 109.2GB | 5 | - | - | 5 |
| 127.4GB | 4 | 1 | - | - |
| 145.6GB | 3 | 2 | - | - |
| 163.8GB | 2 | 3 | - | - |
| 182GB | 1 | 4 | - | - |
| 200.2GB | - | 5 | - | - |
| 237.2GB | - | 4 | 1 | - |
| 274.2GB | - | 3 | 2 | - |
| 311.2GB | - | 2 | 3 | - |
| 348.2GB | - | 1 | 4 | - |
| 385.2GB | - | - | 5 | - |
| 440.4GB[2] | - | - | 6 | - |

This table does not represent all possible HDD configurations.

1. Select a total storage row then add the quantity of HDDs from all columns within an RPM range to the standard HDD.
2. Requires replacement of the standard HDD.

| EIDE Models | |
|---|---|
| **Total Internal Storage[1]** | **7200RPM EIDE HDDs[2]** |
| | **40GB 22P7157** |
| 40GB | Std on EIDE models |
| 80GB | 1 |
| 120GB | 2 |
| 160GB (max) | 3 |

This table does not represent all possible HDD configurations.Total Internal Storage listed is within +/-0.2GB unless otherwise noted.

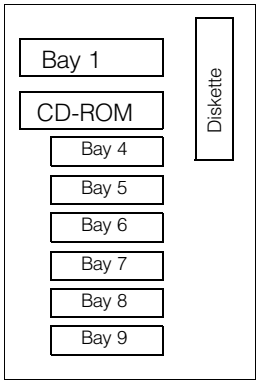
1. Select a total storage row then add the quantity of HDDs to the standard HDD.
2. Supports a maximum of four IDE devices including CD-ROM drives, HDDs and IDE tape drives.

| Bay | Form Factor | Height | Front Access | Usage |
|---|---|---|---|---|
| 1 | 133mm (5.25in) | HH | Yes | open[1] |
| 2 | 133mm (5.25in) | HH | Yes | CD-ROM |
| 3 | 89mm (3.5in) | SL | Yes | Diskette |
| 4 … 8 | 89mm (3.5in) | SL | Yes | open[2] |
| 9 | 89mm (3.5in) | SL | Yes | Std HDD[3] |

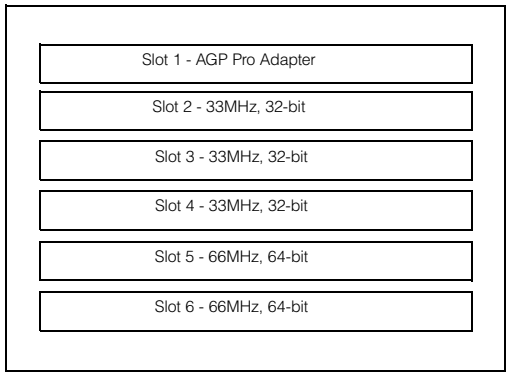
1. Supports removable media devices only. Hard disk drives are not supported.
2. Maximum of six SCSI HDDs supported in SCSI models and a maximum of three IDE HDDs supported without disconnecting the CD-ROM drive in IDE models.
3. The standard IDE HDD is installed in bay five in IDE models.

| Part Number | Description | RPM | Height | Bays Supported[3] | Max Qty |
|---|---|---|---|---|---|
| **IDE HDD[1, 2]** | | | | | |
| 22P7157 | 40GB 7200rpm ATA-100 (EIDE) HDD | 7200 | SL | 4 … 9 | 4 |
| **Ultra160 HDDs[2, 4]** | | | | | |
| 00N8208 | 18.2GB 10,000rpm Ultra160 SCSI HDD | 10000 | SL | 4 … 9 | 6 |
| 00N8209 | 36.4GB 10,000rpm Ultra160 SCSI HDD | 10000 | SL | 4 … 9 | 6 |
| 19K0658 | 18.2GB 15,000rpm Ultra160 SCSI HDD | 15000 | SL | 4 … 9 | 6 |
| 06P5752 | 73.4GB 10Krpm Ultra160 SCSI SL HDD | 10000 | SL | 4 … 9 | 6 |

1. IDE models support a maximum of four IDE devices including CD-ROM drives, IDE hard disk drives and IDE tape drives.
2. Mixing of IDE and SCSI hard disk drives is not supported.
3. Standard HDD installed in bay nine for SCSI models and bay five for IDE models.
4. SCSI models support a maximum of six SCSI HDDs.



## IntelliStation M Pro (dual processor) I/O Options




All slots are full-length.

| Part Number | Description | Adapter Length | PCI Support[1] | Slots Supported[2, 3] |
|---|---|---|---|---|
| | **Storage Controllers[4]** | | | |
| 19K4646 | PCI Wide Ultra160 SCSI Adapter[5] | Half | 32-bit | 2 … 6 |
| 37L6091 | ServeRAID-4L Ultra160 SCSI Controller[6] | Full | 64-bit | 2 … 6 |
| 06P5740 | ServeRAID-4Lx Ultra160 SCSI Controller[7] | Half | 64-bit | 2 … 6 |
| | **Networking[8]** | | | |
| | **Ethernet[9]** | | | |
| 09N9901 | 10/100 EtherLink Server Adapter by 3Com | Half | 32-bit | 2 … 6 |
| 19K4401 | Netfinity Gigabit Ethernet Adapter (copper) | Half | 64-bit | 2 … 6 |
| | **Token Ring** | | | |
| 34L5001 | 16/4 Token-Ring PCI Management Adapter | Half | 32-bit | 2 … 6 |
| 34L5201 | High-Speed 100/16/4 Token-Ring PCI Management Adapter | Half | 32-bit | 2 … 6 |

1. A 64-bit adapter installed into a 32-bit slot will transfer data at 32-bit rates. Adapters rated at 66MHz will operate at 33MHz when installed in a 33MHz slot.
2. IntelliStation M Pro Xeon has six full-length PCI expansion slots.
3. Slot one supports a standard AGP graphics adapter. When the standard graphics adapter is a Fire GL4, slot two is not available to install another adapter.
4. IntelliStation M Pro Xeon includes integrated ATA-100 IDE and Ultra160 SCSI storage controllers.
5. PCI Wide Ultra160 SCSI Adapter (P/N 19K4646) provides a single channel with one internal connector, a five-drop multi-mode terminated LVD SCSI cable and one external 0.8mm VHDCI connector. Only one of the two connectors may be utilized.
6. ServeRAID-4L Ultra160 SCSI Controller is powered by a 100MHz Intel i960 processor and provides a single channel, 16MB of ECC cache and either one internal or one external Ultra160 connection. External connector is 0.8mm VHDCI.
7. ServeRAID-4Lx Ultra160 SCSI Controller is powered by a 100MHz Intel Zion GC80303 processor and provides a single channel, 32MB of ECC cache and either one internal or one external Ultra160 connection. External connector is 0.8mm VHDCI.
8. Wake on LAN® is not supported through the PCI networking adapters.
9. The integrated full duplex 10/100 Intel-based Ethernet controller supports Wake on LAN.

## IntelliStation M Pro (dual processor) Power, Monitors & Accessories

| Part Number | Description |
|---|---|
| | **Power** |
| | IntelliStation M Pro Xeon includes a 480W voltage-sensing power supply and a single line cord. |
| | **Monitors** |
| 655163N | P96 Color Monitor 19in (456mm, 17.9in viewable image), stealth black |
| 66274AN | G78 Color Monitor 17in (406.4mm, 16in viewable image), stealth black |
| 655263N | P260 Color Monitor 21in (503mm, 19.8in viewable image), stealth black |
| 6657HG2 | T750 Hybrid Flat Panel Color Monitor 17in (433mm, 17in viewable image), stealth black |
| 9497AG1 | T86A TFT LCD Color Monitor 18.1in (460mm, 18.1in viewable image), stealth black |
| 6652U3N | P275 Color Monitor 17in (404mm, 15.9in viewable image), stealth black |
| 6658HG2 | T84H TFT LCD Color Monitor 18.1in (460mm, 18.1in viewable image), stealth black |
| 6659HG2 | T210 Flat Panel Color Monitor 20.8in (528mm, 20.8in viewable image), stealth black |
| 9511AG4 | T540 Flat Panel Color Monitor 15in (381mm, 15in viewable image), stealth black |
| 9511HG2 | T54H Color Monitor 15in (383mm, 15.1in viewable image), stealth black |
| 9497DG0 | T86D Flat Panel TFT Monitor 18in (460mm, 18.1in viewable image), stealth black |

| | |
|---|---|
| 9493AG1 | T56 Flat Panel TFT Monitor 15in (383.5mm, 15.1in viewable image), stealth black |
| 65494AN | G96 Color Monitor 19in (454mm, 17.9in viewable image), stealth black |
| | **Conversion Kits** |
| 10L7006 | Netfinity 5000 Tower-to-Rack Conversion Kit |
| | **Keyboard and Mouse** |
| | IntelliStation M Pro Xeon ships standard with an IBM 104-key keyboard and three-button mouse. |

## IntelliStation M Pro (dual processor) Tape Options

| Part Number | Tape Drives | Bays Supported | SCSI Interface (bit) | Form Factor | Termination Included | 68/50-pin Converter Incl | Ext Tape Encl |
|---|---|---|---|---|---|---|---|
| 20L0549 | 10/20GB TR5 Internal IDE Tape Drive | 2 | - | 89mm (3.5in) SL or 133mm (5.25in) HH | - | - | - |
| 09N4042 | 10/20GB NS Internal SCSI Tape Drive | 2 | 8 | 89mm (3.5in) SL or 133mm (5.25in) HH | Y | Y | - |

Note: An integrated Ultra160 SCSI controller with a five-drop multi-mode terminated LVD SCSI cable is standard. Single-ended devices attached to this cable will limit the entire SCSI bus to single-ended performance. Connecting an IDE tape drive to the standard IDE controller will limit the number of hard disk drives supported in IDE models.

Note: Additional tape attributes can be found in Appendix A: Tape Drive Attributes.

# IntelliStation R Pro

| Part Number | Processor Speed (MHz)[2] | Number of Processors (Std/Max) | L2 ECC Cache (KB) | Memory (Std/Max) (R = RDIMM) | Video Adapter | Form Factor | Onboard Ethernet (Mbps) | SCSI Controller (Dual, Ultra, RAID)[5] | Removable Media Bays (Total/Avail) | Internal Hard Disk Drive (Std/Max) | CD-ROM (IDE)[3] | Bays (Total/Avail) | Slots (Total/Avail)[4] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **IntelliStation R Pro At-A-Glance** | | | | | | | | | | | | | |
| 6851-10U[1] | 1.13GHz | 1/2 | 512 | 256MB/4GB | Matrox G200 MMS | Rack (1U) | 2 x 10/100 | IDE | - | 20.4GB/80GB | 24X-10X | 4/1 | 2/0 |
| 6851-11U[1] | 1.13GHz | 1/2 | 512 | 256MB/4GB | Matrox G200 MMS | Rack (1U) | 2 x 10/100 | U160 | - | 18.2GB/146.8GB | 24X-10X | 4/1 | 2/0 |
| 6851-12X[1, 6] | 1.13GHz | 1/2 | 512 | 256MB/4GB | Matrox G200 PAL | Rack (1U) | 2 x 10/100 | IDE | - | 20.4GB/80GB | 24X-10X | 4/1 | 2/0 |
| 6851-13X[1, 6] | 1.13GHz | 1/2 | 512 | 256MB4GB | Matrox G200 PAL | Rack (1U) | 2 x 10/100 | U160 | - | 18.2GB/146.8GB | 24X-10X | 4/1 | 2/0 |

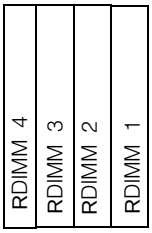
1. Housed in a 19in rack-mountable drawer. Ships standard with a keyboard and mouse. See Rack Cabinets and Options section for supported IBM racks. Refer to xSeries 330 information.
2. Intel Pentium III processor with advanced transfer L2 cache and 133MHz Front-side Bus (FSB).
3. Variable read rate. Actual playback speed will vary and is often less than the maximum possible.
4. All models are equipped with a Matrox G200 multimonitor video adapter and an IBM PCI audio adapter.
5. IntelliStation R Pro has an integrated single-channel Ultra160 SCSI Controller.
6. Not available in the United States. Includes a Matrox G200 PAL video adapter (US models include include a Matrox G200 MMS video adapter).

**IntelliStation R Pro Processors**

| Part Number | Processor Upgrades | SMP Support[1] | Processor Speed Upgrade[2] |
|---|---|---|---|
| 25P2835 | xSeries 1.13GHz Upgrade with 133MHz FSB and 512KB Advanced Transfer Cache Pentium III Processor | 10 … 13X | - |

1. One additional processor may be installed, providing a maximum of two. All processors must be identical in type, speed, and cache size.
2. Requires removal of the standard processor. A maximum of two processors may be installed. All processors must be identical in type, speed and cache size. Upgrades may require a BIOS update. To obtain the latest Flash BIOS, access www.pc.ibm.com/support and enter machine "Type-Model" in Quick Path. Select "Downloadable files" then "BIOS."

## IntelliStation R Pro Memory




| Part Number | Memory Description[1] |
|---|---|
| 10K0018 | 128MB PC133MHz ECC SDRAM RDIMM |
| 10K0020 | 256MB PC133MHz ECC SDRAM RDIMM |
| 10K0022 | 512MB PC133MHz ECC SDRAM RDIMM |
| 33L3326 | 1GB PC133MHz ECC SDRAM RDIMM |

1. Memory RDIMMs must be installed in sequence from RDIMM connector 1 through connector 4. RDIMM size is not relevant.

| Total Memory[1] | Quantity of RDIMMs Added | | | |
|---|---|---|---|---|
| 256MB (1 x 256) Models | 128MB (10K0018) | 256MB (10K0020) | 512MB (10K0022) | 1GB (33L3326) |
| 384MB | 1 | - | - | - |
| 512MB | 2 or | 1 | - | - |
| 640MB | 3 | - | - | - |
| 768MB | - | 2 or | 1 | - |
| 1024MB | - | 3 | - | - |
| 1280MB | - | - | 2 or | 1 |
| 1792MB | - | - | 3 | - |
| 2048MB | - | - | 4[2] or | 2 |
| 2304MB | - | - | - | 2 |
| 3328MB | - | - | - | 3 |
| 4096MB (max) | - | - | - | 4[2] |

This table does not represent all possible memory configurations. Memory modules may vary in price per MB. Selection of smaller RDIMMs may provide a more cost-effective alternative to using larger RDIMMs.
1. Network operating systems may limit the maximum amount of addressable memory. See operating system specifications for further information.
2. Requires removal of standard memory.



## IntelliStation R Pro Hard Disk Drive (HDD) Storage

| SCSI Models | | | | |
|---|---|---|---|---|
| Total Int Storage[1] | 10,000RPM HDDs | | | 15,000RPM HDDs |
| | 18.2GB 00N8208 | 36.4GB 00N8209 | 73.4GB 06P5752 | 18.2GB 19K0658 |
| 18.2GB | (Standard on SCSI models) | | | |
| 36.4GB | 1 | - | - | 1 |
| 54.6GB | - | 1 | - | - |
| 72.8GB[2] | - | 2 | - | - |
| 91.6GB | - | - | 1 | - |
| 146.8GB (max)[2] | - | - | 2 | - |

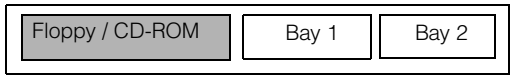
This table does not represent all possible HDD configurations.

1. Select a total storage row then add the quantity of HDDs from all columns within an RPM range to the standard HDD. Total Internal Storage listed is within +/- 0.2GB unless otherwise noted.
2. Requires replacing standard HDD.

| EIDE Models | | |
|---|---|---|
| Total Internal Storage[1] | 7200RPM EIDE HDDs[2] | |
| | 20.4GB 19K4461 | 40GB 22P7157 |
| 20.4GB | (Std on EIDE models) | - |
| 40.8GB | 1 | - |
| 60.4GB | - | 1 |
| 80GB[3] | - | 2 |

This table does not represent all possible HDD configurations.Total Internal Storage listed is within +/-0.2GB unless otherwise noted.

1. Select a total storage row then add the quantity of HDDs from both columns to the standard HDD.
2. The R Pro dual integrated EIDE controllers support a maximum of three IDE devices per machine including one CD-ROM and two IDE HDDs.
3. Requires removal of the standard HDD.




| Bay | Form Factor | Height | Front Access | Usage |
|---|---|---|---|---|
| 1[1] | 89mm (3.5in) | SL | Yes | HDD[2] |
| 2 | 89mm (3.5in) | SL | Yes | Open |

1. Boot drive should be located in bay one.
2. Fixed disk and IDE models ship with one standard HDD.

| Part Number | Description | RPM | Height | Bays Supported | Max Qty |
|---|---|---|---|---|---|
| **IDE HDDs[1, 2]** | | | | | |
| 19K4461 | 20.4GB 7200rpm ATA-100 (EIDE) HDD | 7200 | SL | 1, 2 | 2 |
| 22P7157 | 40GB 7200rpm ATA-100 (EIDE) HDD | 7200 | SL | 1, 2 | 2 |
| **Nonhot-swap Ultra160 HDDs[2]** | | | | | |
| 00N8208 | 18.2GB 10,000rpm Ultra160 SCSI HDD | 10000 | SL | 1, 2 | 2 |
| 00N8209 | 36.4GB 10,000rpm Ultra160 SCSI HDD | 10000 | SL | 1, 2 | 2 |
| 19K0658 | 18.2GB 15,000rpm Ultra160 SCSI HDD | 15000 | SL | 1, 2 | 2 |
| 06P5752 | 73.4GB 10Krpm Ultra160 SCSI Hot-Swap SL HDD | 10000 | SL | 1, 2 | 2 |

1. The R Pro dual integrated EIDE controllers support a maximum of three IDE devices per machine including one CD-ROM and two IDE hard disk drives. IDE HDDs are supported only on IDE models.
2. Mixing of IDE and SCSI hard disk drives is not supported.

## IntelliStation R Pro Power, Monitors & Accessories

| Part Number | Description |
|---|---|
| **Power[1]** | |
| **Uninterruptible Power Supply (UPS)[2]** | |
| 94G6674 | APC Smart-UPS 1400RMB[3] |
| 94G6676 | APC Smart-UPS 3000RMB[3] |
| 37L6861 | APC Smart-UPS 5000RMB[4] |
| **Monitors[5, 6]** | |
| 66274AN | G78 Color Monitor 17in (406.4mm, 16in viewable image), stealth black[7] |
| 655063N | P76 Color Monitor 17in (407mm, 16in viewable image), stealth black |
| 655163N | P96 Color Monitor 19in (456mm, 17.9in viewable image), stealth black |
| 65494AN | G96 Color Monitor 19in (454mm, 17.9in viewable image), stealth black |
| 655263N | P260 Color Monitor 21in (503mm, 19.8in viewable image), stealth black |
| 6657HG2 | T750 Hybrid Flat Panel Color Monitor 17in (433mm, 17in viewable image), stealth black |
| 6658HG2 | T84H TFT LCD Color Monitor 18.1in (460mm, 18.1in viewable image), stealth black |
| 9497AG1 | T86A TFT LCD Color Monitor 18.1in (460mm, 18.1in viewable image), stealth black |

1. IntelliStation R Pro includes a worldwide, voltage sensing 200W power supply with auto restart and two 9ft line cords. One line cord contains a 110V NEMA 5-15P connector while the other contains an IEC 320 C14 for attachment to a high voltage PDU or UPS.
2. For runtimes and UPS attributes see Appendix C: UPS Runtime Estimate.
3. Height is 3U. See Rack Cabinets and Options section for supported IBM racks.
4. Height is 5U. See Rack Cabinets and Options section for supported IBM racks.
5. Third-party sourcing is required for connecting the rack-mounted R Pro system to remote workstation console devices. Keyboard, video and mouse (KVM) connectivity hardware for IntelliStation R Pro is not available through IBM but can be purchased through various vendors including the following:
AmuletHotKey in London, England on the Web at www.amulet-hotkey.com or telephone +44(0)20 7407 2522.
Wey Technology AG in Rotkreuz, Germany at info@wey.ch (E-mail) or telephone +41 41 798 20 49.
IBM makes no representations or warranties with respect to non-IBM products.
These products are offered and warranted by third parties, not IBM.
6. All monitors listed except G78 (P/N 66274AN) are supported only for desktop installation.
7. Installation within a rack requires optional Monitor Compartment (P/N 94G7444).



| Part Number | Description |
|---|---|
| | **Rack and NetBAY[1, 2]** |
| | Refer to the Rack Cabinets and Options section for information concerning IBM racks and rack-supported devices. |
| | **Keyboard and Mouse[3, 4]** |
| 28L3644 | Space Saver II Keyboard[5, 6] |
| 01K1260 | TrackPoint IV 104-key Black Keyboard[6] |
| 28L3673 | Sleek 2-button Stealth Black Mouse |

1. InstalliStation R Prois housed in a 19in rack-mountable drawer and requires one of the racks listed in the Rack Cabinets and Options section for the xSeries 330.
2. Note limitations and restrictions required for adequate cooling in the Rack Cabinets and Options section for xSeries 330. If non-IBM racks are to be used, assure that both the front and rear doors offer a minimum of 48% open area uniformly distributed and in line with installed servers. A clearance of 51 to 64mm (2 to 2.5in) must be maintained between the front door and the system unit's front bezel. The rear door must maintain the same or greater clearance.
3. IntelliStation R Pro supports rack configurations only, but ships with a standard keyboard and mouse.
4. Third-party sourcing is required for connecting the rack-mounted R Pro system to remote workstation console devices. Keyboard, video and mouse (KVM) connectivity hardware for IntelliStation R Pro is not available through IBM but can be purchased through various vendors including the following:
AmuletHotKey in London, England on the Web at www.amulet-hotkey.com or telephone +44(0)20 7407 2522.
Wey Technology AG in Rotkreuz, Germany at info@wey.ch (E-mail) or telephone +41 41 798 20 49.
IBM makes no representations or warranties with respect to non-IBM products.
These products are offered and waranted by third parties, not IBM.
5. Installation within a rack requires optional keyboard tray (P/N 28L4707), which stows in ready-to-use position.
6. Advanced TrackPoint IV features are not available on IntelliStation R Pro systems.

# IntelliStation Z Pro

| Part Number | Processor Speed (MHz)[2] | Number of Processors (Std/Max) | L2 ECC Cache | Memory (Std/Max) | Video Adapter | Form Factor | Onboard Ethernet (Mbps) | SCSI Controller (Dual, Ultra, RAID) | Removable Media Bays (Total/Avail) | Internal Hard Disk Drive (Std/Max) | CD-ROM (IDE) | Bays (Total/Avail) | Slots (Total/Avail) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **IntelliStation Z Pro At-A-Glance** | | | | | | | | | | | | | |
| 6894-10X[1] | 800 | 2/2 | 2MB | 2GB/16GB | Matrox Millennium G450 | Tower | 10/100 | D,U160[3] | 4/2 | 18.2GB/ 182GB | 12X-8X-32X[4] | 9/7 | 8/6 |
| 6894-12X | 800 | 2/2 | 2MB | 2GB/16GB | NVIDIA Quadro2 Pro | Tower | 10/100 | D,U160[3] | 4/2 | 36.4GB/ 182GB | 12X-8X-32X[4] | 9/7 | 8/6 |

1. IntelliStation Z Pro ships with a keyboard and mouse. See "Power, Monitors and Accessories" for a list of compatible monitors.
2. Intel Itanium™ processor with advanced transfer ECC L2 cache and double-pumped 133MHz FSB.
3. IntelliStation Z Pro includes a dual channel Ultra160 SCSI controller installed in slot two. The controller provides two external 0.8mm VHDCI connectors on one channel and three internal connectors on the other channel. Two of the internal connectors are 68-pin, 16-bit Ultra160 (LVD) and the third is a 50-pin, 8-bit Ultra2 connector. A five-drop multi-mode terminated LVD SCSI cable is included.
4. Variable read rate. Actual playback speed will vary and is often less than the maximum possible.

## IntelliStation Z Pro Memory

| Total Memory[1] | Quantity of DIMMs Added[2] | | |
|---|---|---|---|
| **4x 512MB (2GB) Standard** | **4 x 256MB (33L3258)** | **4 x 512MB (33L3260)** | **4 x 1GB (33L3262)** |
| 3GB | 1 | - | - |
| 4GB | 2 | - | - |
| 5GB | 1 | 1 | - |
| 6GB | - | 2 | - |
| 7GB | 1 | 2 | - |
| 8GB | - | 3 | - |
| 9GB | 1 | 1 | 1 |
| 10GB | - | 2 | 1 |
| 11GB | 1 | - | 2 |
| 12GB | - | 1 | 2 |
| 13GB[3] | 1 | - | 3 |
| 14GB | - | - | 3 |
| 16GB[3] (max) | - | - | 4 |

This table does not represent all possible memory configurations. Memory options are available only in packs of four.

1. Network operating systems may limit the maximum amount of addressable memory. See operating system specifications for further information.
2. To obtain the quantity of memory identified in the "Total Memory" column, select the appropriate row and order the quantity of DIMMs identified in all columns for that row, which will be added to the standard memory noted at the top of the far left column.
3. Requires removal of standard DIMMs.

Memory Card A (top of card)

| | |
|---|---|
| Bank 1- J4A1 | Bank 1- J9A1 |
| Bank 1- J4B1 | Bank 1- J9B1 |
| Bank 3- J4B2 | Bank 3- J9B2 |
| Bank 3- J4B3 | Bank 3- J9B3 |

Memory Card B (top of card)

| | |
|---|---|
| Bank 2- J4A1 | Bank 2- J9A1 |
| Bank 2- J4B1 | Bank 2- J9B1 |
| Bank 4- J4B2 | Bank 4- J9B2 |
| Bank 4- J4B3 | Bank 4- J9B3 |

| Part Number | Memory Description[1] |
|---|---|
| 33L3258 | 4 x 256MB 100MHz SDRAM DIMM |
| 33L3260 | 4 x 512MB 100MHz SDRAM DIMM |
| 33L3262 | 4 x 1GB 100MHz SDRAM DIMM |

1. Due to two- and four-way interleaving, all DIMMs installed in each of the two or four banks must be the same size to achieve maximum performance. Each of the four DIMMs installed in a bank must be the same size and each bank must contain four DIMMs if the bank is populated. DIMMs in other banks can be different sizes, which might affect performance. Install DIMMs in sequence bank one through four. All compatible memory options are available only in packs of four.

## IntelliStation Z Pro Hard Disk Drive (HDD) Storage

| Total Internal Storage[1] | 10,000RPM HDDs | |
|---|---|---|
| | 18.2GB (00N8208) | 36.4GB (00N8209) |
| 18.2GB | 1[2] | - |
| 36.4GB | - | 1[3] |
| 54.6GB | 1 | 1 |
| 72.8GB | - | 2 |
| 91GB | 1 | 2 |
| 109.2GB | - | 3 |
| 127.4GB | 1 | 3 |
| 145.6GB | - | 4 |
| 163.8GB | 1 | 4 |
| 182GB[4] | - | 5 |

This table does not represent all possible HDD configurations.

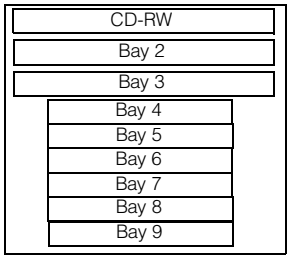
1. Select a total storage row and then add HDDs from both columns. Total Internal Storage is within +/- 0.2GB unless otherwise noted.
2. Standard on model 10X.
3. Standard on model 12X.
4. This HDD configuration requires replacement of the standard HDD on model 10X.

| Bay | Form Factor | Height | Front Access | Usage |
|---|---|---|---|---|
| 1 | 133mm (5.25in) | HH | Yes | IDE CD-RW |
| 2 | 133mm (5.25in) | HH | Yes | open[1] |
| 3 | 133mm (5.25in) | HH | Yes | open[1] |
| 4 … 8 | 89mm (3.5in) | SL | Yes | open |
| 9 | 89mm (3.5in) | SL | Yes | Std HDD |

1. Supports removable media devices only. Hard disk drives are not supported.

| Part Number | Description | RPM | Height | Bays Supported | Max Qty |
|---|---|---|---|---|---|
| **Non-Hot-Swap Ultra 160 HDDs** | | | | | |
| 00N8208 | 18.2GB 10,000rpm Ultra160 SCSI HDD | 10000 | SL | 4 … 9[1] | 5[2] |
| 00N8209 | 36.4GB 10,000rpm Ultra160 SCSI HDD | 10000 | SL | 4 … 9[1] | 5[2] |
| **Optical Devices** | | | | | |
| 10K3785 | 12X-8X-32X Black Internal CD-RW Drive | - | | | |

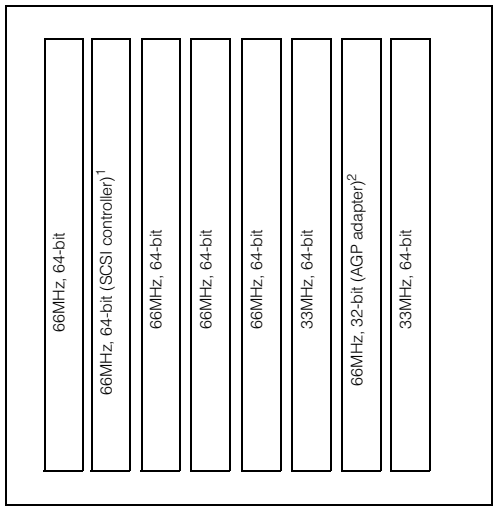
1. The standard HDD is installed in bay nine.
2. The five-drop cable allows installation of a maximum of five HDDs.




## IntelliStation Z Pro I/O Options

| Part Number | Description | Adapter Length | PCI Support | Slots Supported[2] |
|---|---|---|---|---|
| **Storage Controllers** | | | | |
| 19K4646 | PCI Wide Ultra160 SCSI Adapter[1] | Half | 32-bit | 1 … 8 |
| **Networking** | | | | |
| **Ethernet** | | | | |
| 19K4401 | Netfinity Gigabit Ethernet Adapter (copper) | Half | 64-bit | 1 … 8 |

1. PCI Wide Ultra160 SCSI Adapter (P/N 19K4646) provides a single channel with one internal connector, a five-drop multi-mode terminated LVD SCSI cable and one external 0.8mm VHDCI connector. Only one of the two connectors may be utilized.
2. A 64-bit adapter installed into a 32-bit slot will transfer data at 32-bit rates. Adapters rated at 66MHz will operate at 33MHz when installed in a 33MHz slot. 33MHz adapters will reduce 66MHz buses to 33MHz.




All slots are full-length.

1. Dual channel Ultra160 SCSI Adapter installed in slot two.
2. Supports Matrox Millennium G450 Graphics Accelerator with 16MB video memory (model 10X) or NVIDIA Quadro2 Pro with 64MB video memory (model 12X).

## IntelliStation Z Pro Power, Monitors & Accessories

| Part Number | Description |
|---|---|
| | **Power** |
| | IntelliStation Z Pro includes an 800W voltage-sensing power supply and a single line cord. |
| | **Monitors** |
| 655163N | P96 Color Monitor 19in (456mm, 17.9in viewable image), stealth black |
| 66274AN | G78 Color Monitor 17in (406.4mm, 16in viewable image), stealth black |
| 655263N | P260 Color Monitor 21in (503mm, 19.8in viewable image), stealth black |
| 6657HG2 | T750 Hybrid Flat Panel Color Monitor 17in (433mm, 17in viewable image), stealth black |
| 9497AG1 | T86A TFT LCD Color Monitor 18.1in (460mm, 18.1in viewable image), stealth black |
| | **Keyboard and Mouse** |
| | IntelliStation Z Pro ships standard with an IBM 104-key keyboard and three-button mouse. |

## IBM xSeries 130/135

| Part Number | Processor Speed (MHz)[2] | Number of Processors (Std/Max) | L2 ECC Cache (KB) | Memory (Std/Max) (R = RDIMM)[6] | Form Factor | Power Supply Quantity (Std/Max) | Hot-Swap (Power, Slots, HDD, Fans) | Redundancy (Optional, Standard) | Adv System Management Processor | Onboard Ethernet (Mbps) | SCSI Controller (Dual, Ultra, RAID) | Removable Media Bays (Total/Avail) | Internal Hard Disk Drive (Std/Max) | CD-ROM (IDE)[3] | Bays (Total/Avail) | Slots (Total/Avail) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **xSeries 130 At-A-Glance** | | | | | | | | | | | | | | | | |
| 8654-1YX[1, 4] | 800 | 1/2 | 256 | 256MB(R) / 2GB | Rack (1U) | 1/1 | H | - | Y | 2 x 10/100 | U160 | - | 9.1/45.5GB | 24X-10X | 4/1 | 2/2 |
| 8672-25X[1, 4] | 800 | 1/1 | 128 | 256MB(R) / 1.5GB | Rack (1U) | 1/1 | - | - | N | 2 x 10/100 | IDE | - | 20.4GB/80GB | 24X-10X | 4/1 | 2/2 |
| 8654-5DX[1, 4] | 1GHz | 1/2 | 256 | 256MB(R) / 2GB | Rack (1U) | 1/1 | - | - | N | 2 x 10/100 | U160 | - | 18.2GB/72.8GB | 24X-10X | 4/1 | 2/2 |
| **xSeries 135 At-A-Glance** | | | | | | | | | | | | | | | | |
| 8654-1XX[1, 5] | 800 | 1/2 | 256 | 256MB(R) / 2GB | Rack (1U) | 1/1 | H | - | N | 2 x 10/100 | U160 | - | 9.1/45.5GB | 24X-10X | 4/1 | 2/2 |
| 8672-24X[1, 5] | 800 | 1/1 | 128 | 256MB(R) / 1.5GB | Rack (1U) | 1/1 | - | - | N | 2 x 10/100 | IDE | - | 20.4GB/80GB | 24X-10X | 4/1 | 2/2 |
| 8654-5CX[1, 5] | 1GHz | 1/2 | 256 | 256MB(R) / 2GB | Rack (1U) | 1/1 | - | - | Y | 2 x 10/100 | U160 | - | 18.2GB/72.8GB | 24X-10X | 4/1 | 2/2 |

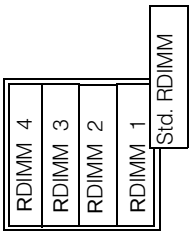
1. Housed in a 19in rack-mountable drawer and ships standard without a keyboard or mouse. See Rack Cabinets and Options section for supported IBM racks.
2. Intel Pentium III processor with advanced transfer L2 cache and 133MHz Front-Side Bus (FSB). Models 1YX, 1XX, 25X and 24X do not provide SMP support.
3. Variable read rate. Actual playback speed will vary and is often less than the maximum possible.
4. This system is a superior Web-hosting appliance delivering full X-architecture™ integration and system management capabilities. Powered by Windows 2000 technology, Microsoft Internet Information Services, and Web Server Accelerator, the x130 offers the performance and reliability for the most demanding e-business companies.
5. This system is a price/performance Web hosting solution based on Linux and IBM HTTP Server. The x135 is an ideal solution for customers who have chosen the open source architecture and are seeking the lowest possible price for Web hosting. A key offering for ISPs.
6. Optimum performance occurs with 1GB total memory installed.

### xSeries 130 / 135 Processors

| Part Number | Processor Upgrades | SMP Support[1] |
|---|---|---|
| 10K0053 | 1GHz Upgrade with 133MHz FSB and 256KB Advanced Transfer Cache Pentium III Processor | 5CX, 5DX |

1. One additional processor may be installed, providing a maximum of two. All processors must be identical in type, speed, and cache size. SMP support is not available for 800MHz models. Upgrading processor speed for those models requires removing the standard processor and installing one or two 1GHz processors.

### Models 1YX, 1XX, 5CX and 5DX




| Part Number | Memory Description[1] |
|---|---|
| 33L3142 | 128MB, 133MHz ECC SDRAM RDIMM II |
| 33L3144 | 256MB, 133MHz ECC SDRAM RDIMM II |
| 33L3146 | 512MB, 133MHz ECC SDRAM RDIMM II |
| 33L3152 | 1GB, 133MHz ECC SDRAM RDIMM II |

1. Memory RDIMMs must be installed in sequence from RDIMM connector 1 through connector 4. RDIMM size is not relevant.

| Models 1YX, 1XX, 5CX and 5DX | | | | |
|---|---|---|---|---|
| Total System Memory[1] | Quantity of RDIMMs Added | | | |
| 1 x 256MB (std) | 128MB (33L3142) | 256MB (33L3144) | 512MB (33L3146) | 1GB (33L3152) |
| 384MB | 1 | - | - | - |
| 512MB | 2 or | 1 | - | - |
| 640MB | 3 | - | - | - |
| 768MB | - | 2 or | 1 | - |
| 1024MB | - | 3 | - | - |
| 1280MB | - | - | 2 or | 1 |
| 1792MB | - | - | 3 | - |
| 2048MB[2] | - | - | 4 or | 2 |

This table does not represent all possible memory configurations. Memory modules may vary in price per MB. Selection of smaller RDIMMs may provide a more cost-effective alternative to using larger RDIMMs.
1. Network operating systems may limit the maximum amount of addressable memory. See operating system specifications for further information. Optimum performance occurs with 1GB total memory.
2. Requires removal of standard memory.

### Models 24X and 25X

| |
|---|
| DIMM Socket 1 |
| DIMM Socket 2 |
| DIMM Socket 3 |

| Part Number | Memory Description[1] |
|---|---|
| 33L3081 | 128MB, 133MHz ECC SDRAM DIMM Memory |
| 33L3083 | 256MB, 133MHz ECC SDRAM DIMM Memory |
| 33L3085 | 512MB, 133MHz ECC SDRAM Unbuffered DIMM Memory |

| Models 24X and 25X | | | |
|---|---|---|---|
| Total System Memory[1] | Quantity of RDIMMs Added | | |
| 1 x 256MB (std) | 128MB (33L3081) | 256MB (33L3083) | 512MB (33L3085) |
| 384MB | 1 | - | - |
| 512MB | 2 | - | - |
| 640MB | 1 | 1 | - |
| 768MB | - | 2 | - |
| 1024MB | - | 1 | 1 |
| 1280MB | - | - | 2 |
| 1536MB[2] | - | - | 3 |

This table does not represent all possible memory configurations. Memory modules may vary in price per MB. Selection of smaller RDIMMs may provide a more cost-effective alternative to using larger RDIMMs.
1. Network Operating Systems may limit the maximum amount of addressable memory. See operating system specifications for further information. Optimum performance occurs with 1GB total memory.
2. Requires removal of standard memory.

## xSeries 130 / 135 Hard Disk Drive (HDD) Storage

| Models 1YX, 1XX, 5CX and 5DX | | | | | | |
|---|---|---|---|---|---|---|
| **Total Int Storage[1]** | **7200RPM HDDs** | | | **10,000RPM HDDs** | | |
| | **9.1GB (37L7201)** | **18.2GB (37L7202)** | **36.4GB (37L7203)** | **9.1GB (P/N 37L204)** | **18.2GB (P/N 37L7205)** | **36.4GB (P/N 37L7206)** |
| 9.1GB | Standard on base models[2] | | | | | |
| 18.2GB | 1 | - | - | 1 | - | - |
| 27.3GB | - | 1 | - | - | 1 | - |
| 45.5GB | - | - | 1 | - | - | 1 |

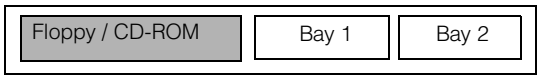
This table does not represent all possible HDD configurations.

1. Select a total storage row then add the quantity of HDDs from all columns within an RPM range to the standard HDD. Total Internal Storage listed is within +/- 0.2GB unless otherwise noted.
2. The standard 9.1GB HDD is 10,000RPM (P/N 37L7204).

| Models 1YX, 1XX, 5CX and 5DX | | | | |
|---|---|---|---|---|
| **Bay** | **Form Factor** | **Height** | **Front Access** | **Usage** |
| 1[1] | HS | SL | Yes | HDD |
| 2 | HS | SL | Yes | Open |

1. Boot drive should be located in bay 1.

| Models 1YX, 1XX, 5CX and 5DX | | | | | |
|---|---|---|---|---|---|
| **Part Number** | **Description** | **RPM** | **Height** | **Bays Supported** | **Max Qty** |
| | **Ultra160 Hard Disk Drives (HDD)** | | | | |
| 37L7201 | 9.1GB Ultra160 SCSI Hot-Swap SL HDD | 7200 | SL | 1 … 2 | 2 |
| 37L7202 | 18.2GB Ultra160 SCSI Hot-Swap SL HDD | 7200 | SL | 1 … 2 | 2 |
| 37L7203 | 36.4GB Ultra160 SCSI Hot-Swap SL HDD | 7200 | SL | 1 … 2 | 2 |
| 37L7204 | 9.1GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD | 10000 | SL | 1 … 2 | 2 |
| 37L7205 | 18.2GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD | 10000 | SL | 1 … 2 | 2 |
| 37L7206 | 36.4GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD | 10000 | SL | 1 … 2 | 2 |




| Models 24X and 25X | | |
|---|---|---|
| **Total Int Storage[1]** | **7200RPM IDE HDDs[2]** | |
| | **20.4GB 19K4461** | **40GB 22P7157** |
| 20.4GB | Standard on EIDE models | - |
| 40.8GB | 1 | - |
| 60.4GB | - | 1 |
| 80GB[3] | - | 2 |

This table does not represent all possible HDD configurations. Total Internal Storage listed is within +/- 0.2GB unless otherwise noted.

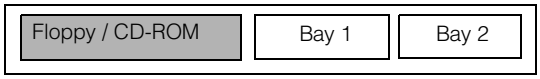
1. Select a total storage row then add the quantity of HDDs from all columns to the standard HDD.
2. The xSeries 130/135 dual integrated EIDE controllers support a maximum of three IDE devices per machine including one CD-ROM and two IDE HDDs.
3. Requires removal of the standard HDD.

| Models 24X and 25X | | | | |
|---|---|---|---|---|
| **Bay** | **Form Factor** | **Height** | **Front Access** | **Usage** |
| 1[1] | 89mm (3.5in) | SL | Yes | HDD |
| 2 | 89mm (3.5in) | SL | Yes | Open |

1. Boot drive should be located in bay 1.

| Models 24X and 25X | | | | | |
|---|---|---|---|---|---|
| **Part Number** | **Description** | **RPM** | **Height** | **Bays Supported** | **Max Qty** |
| **IDE HDDs[1]** | | | | | |
| 19K4461 | 20.4GB 7200rpm ATA-100 (EIDE) HDD | 7200 | SL | 1, 2 | 2 |
| 22P7157 | 40GB 7200rpm ATA-100 (EIDE) HDD | 7200 | SL | 1, 2 | 2 |

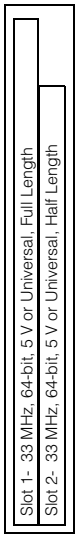
1. Mixing of IDE and SCSI hard disk drives is not supported.




## xSeries 130 / 135 I/O Options

| Part Number | Description | Adapter Length | PCI Support | Slots Supported[2] |
|---|---|---|---|---|
| **Networking[1]** | | | | |
| 19K4401 | Netfinity Gigabit Ethernet Adapter (copper)[3] | Half | 64-bit | 1, 2 |
| **Systems Management[4]** | | | | |
| 01K7209 | Netfinity Advanced System Management PCI Adapter | Full | 32-bit | 1 |
| 03K9309 | Netfinity Advanced System Management Interconnect Cable Kit | - | - | - |
| 36L9654 | Netfinity Advanced System Management Token-Ring Connection | - | - | - |

1. xSeries 130 / 135 includes dual full-duplex, 10/100Mbps Ethernet controllers.
2. A 64-bit adapter installed into a 32-bit slot will transfer data at 32-bit rates. Adapters rated at 66MHz will operate at 33MHz when installed in a 33MHz slot.
3. Supported only on model 5DX.
4. xSeries 130 / 135 has a single integrated system management port and a single RS485 port.



## xSeries 130 / 135 Power, Monitors & Accessories

| Part Number | Description |
|---|---|
| | **Power[1]** |
| | **Uninterruptible Power Supply (UPS)[2]** |
| 94G6674 | APC Smart-UPS 1400RMB[3] |
| 94G6676 | APC Smart-UPS 3000RMB[3] |
| 37L6861 | APC Smart-UPS 5000RMB[4] |
| | **Monitors[5]** |
| 06P4792 | Cable Chain Technology Cable Kit[6] |
| 633347N | E51 Color Monitor 15in (350mm, 13.8in Viewable Image Size), stealth black[7] |
| 6331N2N | E54 Color Monitor 15in (350mm, 13.8in Viewable Image Size), stealth black[7] |
| 6332J1N | E74 Color Monitor 17in (403mm, 15.9in Viewable Image Size), stealth black[7] |
| 66274AN | G78 Color Monitor 17in (406.4mm, 16in Viewable Image Size), stealth black[7] |
| 9511AG4 | T540 Flat Panel Color Monitor 15in (381mm, 15in viewable image), stealth black[8] |

1. The xSeries 130 /135 includes a worldwide, voltage sensing 200W power supply with auto restart and two 9ft line cords. One line cord contains a 110V NEMA 5-15P connector while the other contains an IEC 320 C14 for attachment to a high voltage PDU or UPS.
2. For runtimes and UPS attributes see Appendix C: UPS Runtime Estimate.
3. Height is 3U. See Rack Cabinets and Options section for supported IBM racks.
4. Height is 5U. See Rack Cabinets and Options section for supported IBM racks.
5. The xSeries 130 / 135 uses an SVGA controller (S-3 Savage4 chipset) with 8MB of video memory.
6. A Cable Chain Technology (C2T) Cable Kit (P/N 06P4792) is available for models 1YX, 1XX, 5DX and 5CX for attachment of console devices to one or multiple chained systems if the standard breakout cable (265mm/10in) is not long enough. Chaining technology is not applicable to models 24X and 25X. A short chaining cable is provided standard with models 5DX and 5CX.
The C2T Cable Kit contains a 2M (6.5ft) breakout cable for attachment to a keyboard, mouse and monitor as well as a 2M (6.5ft) chaining cable for connecting two xSeries systems together (models 1YX and 1XX) or for extending the distance requirement for models 5DX and 5CX if the standard 260mm (10in) chaining cable is not long enough. A maximum of 42 xSeries 130/135s are supported in a single chain. No more than one C2T Cable Kit may be used. If the last server in the chain is connected to a console switch rather than directly to a monitor, a console cable (P/N 09N4293 or 94G7447) is required in addition to the C2T Kit.
7. Installation within a rack requires optional Monitor Compartment (P/N94G7444).
8. Installation within a rack requires optional Netfinity Flat Panel Monitor Rack Mount Kit II (P/N 37L6888) and Netfinity Rack Keyboard Tray (P/N 28L4707). A space saver keyboard may coexist within the same 28L4707 keyboard tray.

| | |
|---|---|
| | **Rack and NetBAY[1]** |
| | Refer to the Rack Cabinets and Options section for information concerning IBM racks and rack-supported devices. |
| | **Keyboard and Mouse[2]** |
| 06P4792 | Cable Chain Technology Cable Kit[3] |
| 28L3644 | Space Saver II Keyboard[4] |
| 28L3621 | Preferred Keyboard (stealth black)[5] |
| 28L3673 | Sleek 2-button Stealth Black Mouse |

1. xSeries 130 / 135 are housed in a 19in rack-mountable drawer and require one of the racks listed in the Rack Cabinets and Options section.
2. xSeries 130/135 supports rack configurations only and ships without a keyboard or mouse.
3. A Cable Chain Technology (C2T) Cable Kit (P/N 06P4792) is available for models 1YX, 1XX, 5DX and 5CX for attachment of console devices to one or multiple chained systems if the standard breakout cable (265mm/10in) is not long enough. Chaining technology is not applicable to models 24X and 25X. A short chaining cable is provided standard with models 5DX and 5CX.
The C2T Cable Kit contains a 2M (6.5ft) breakout cable for attachment to a keyboard, mouse and monitor as well as a 2M (6.5ft) chaining cable for connecting two xSeries systems together (models 1YX and 1XX) or for extending the distance requirement for models 5DX and 5CX if the standard 260mm (10in) chaining cable is not long enough. A maximum of 42 xSeries 130/135s are supported in a single chain. No more than one C2T Cable Kit may be used. If the last server in the chain is connected to a console switch rather than directly to a monitor, a console cable (P/N 09N4293 or 94G7447) is required in addition to the C2T Kit.
4. Installation within a rack requires optional keyboard tray (P/N 28L4707) which stows in ready-to-use position.
5. Installation within a rack requires optional keyboard tray (P/N 28L4707). This keyboard cannot share a keyboard tray with a flat panel display.

# IBM xSeries 220 ICA

**xSeries 220 ICA At-A-Glance**

| Part Number | Processor Speed (MHz)[1] | Number of Processors (Std/Max) | L2 ECC Cache (KB) | Memory (Std/Max) (R=RDIMM) | Form Factor | Power Supply Quantity (Std/Max) | Hot-Swap (Power, Slots, HDD, Fans) | Redundancy (Optional, Standard) | Adv System Management Processor | Onboard Ethernet (Mbps) | SCSI Controller (Dual, Ultra, RAID) | Removable Media Bays (Total/Avail) | Internal Hard Disk Drive (Std/Max) | CD-ROM (IDE)[3] | Bays (Total/Avail) | Slots (Total/Avail) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8645-34X[4, 5] | 866 | 1/2 | 256 | 256MB(R)/4GB | Tower | 1/1 | - | - | - | 10/100 | U160[2] | 4/2 | 18.2GB/ 145.6GB | 48X-20X | 7/4 | 5/5 |

1. Intel Pentium III processor with advanced transfer L2 cache and 133MHz FSB.
2. xSeries 220 Internet Caching Appliance (ICA) has an integrated Ultra160 SCSI Controller with a single internal channel and includes a five-drop, multi-mode terminated LVD SCSI cable.
3. Variable read rate. Actual playback speed will vary and is often less than the maximum possible.
4. Tower-tier ICA forward proxy software preload designed for small offices with up to 50 users.
5. This appliance is preconfigured and optimized to support specific Internet applications per the Volera Excelerator V2.0 Internet Caching software licensing structure. Performance can be enhanced by installing additional memory, 15Krpm HDD storage, gigabit Ethernet adapters and additional or faster processors (impact of processor speed less significant than other options).

**xSeries 220 ICA Processors**

| Part Number | Processor Upgrades | SMP Support[1] | Processor Speed Upgrade[2] |
|---|---|---|---|
| 10K3818 | Netfinity 866MHz with 133MHz FSB and 256KB Advanced Transfer Cache Pentium III Upgrade Processor | 34X | - |
| 10K3819 | Netfinity 933MHz with 133MHz FSB and 256KB Advanced Transfer Cache Pentium III Upgrade Processor | - | 34X |

1. One additional processor may be installed, providing a maximum of two. All processors must be identical in type, speed, and cache size.
2. Requires removal of the standard processor. A maximum of two processors may be installed. Optimal performance is achieved with the standard processor, i.e., upgrading the processor does not necessarily increase performance. Upgrades may require a BIOS update. To obtain the latest Flash BIOS, access www.pc.ibm.com/support and enter machine "Type-Model" in Quick Path. Select "Downloadable files" and then "BIOS".

-

**xSeries 220 ICA Memory**

| RDIMM Socket |
|---|
| RDIMM Socket |
| RDIMM Socket |
| RDIMM Socket |

| Part Number | Memory Description |
|---|---|
| 33L3142 | 128MB 133MHz SDRAM ECC RDIMM Memory |
| 33L3144 | 256MB 133MHz SDRAM ECC RDIMM Memory |
| 33L3146 | 512MB 133MHz SDRAM ECC RDIMM Memory |
| 33L3152 | 1GB 133MHz SDRAM ECC RDIMM |

Adding memory options will require additional Volera licenses.

| Total System Memory[1] | Quantity of RDIMMs Added | | | |
|---|---|---|---|---|
| 256MB (std) | 128MB (33L3142) | 256MB (33L3144) | 512MB (33L3146) | 1GB (33L3152) |
| 384MB | 1 | - | - | - |
| 512MB | - | 1 | - | - |
| 640MB | 1 | 1 | - | - |
| 768MB | 2 | 1 | - | - |
| 1024MB | - | 3 | - | - |
| 1280MB | - | - | 2 | - |
| 1536MB | - | 1 | 2 | - |
| 1792MB | - | - | 3 | - |
| 2048MB[2] | - | - | 4 | - |
| 2560MB[2] | - | - | 3 | 1 |
| 3072MB[2] | - | - | 2 | 2 |
| 4096MB[2] (max) | - | - | - | 4 |

This table does not represent all possible memory configurations. Memory modules may vary in price per MB. Selection of smaller RDIMMs may provide a more cost-effective alternative to using larger RDIMMs. Select the desired total memory from the appropriate column (Standard Model 256MB), then select a quantity in that row from one of the RDIMM columns.

1. Network operating systems may limit the maximum amount of addressable memory. See operating system specifications for further information.
2. Requires removal of standard memory.

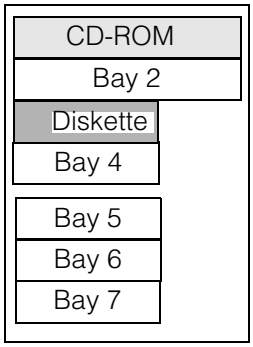
## xSeries 220 ICA Hard Disk Drive (HDD) Storage

| Total Internal Storage[1] | 7200RPM HDDs | | | 10,000RPM HDDs | | | 15,000RPM HDDs |
|---|---|---|---|---|---|---|---|
| | 9.1GB 00N8204 | 18.2GB 00N8205 | 36.4GB 00N8206 | 9.1GB 00N8207 | 18.2GB 00N8208 | 36.4GB 00N8209 | 18.2GB 19K0658 |
| 18.2GB | - | - | - | - | 1[2] | - | - |
| 27.3GB | 1 | 1 | - | 1 | 1 | - | - |
| 36.4GB | - | 2 | - | - | 2 | - | 2 |
| 54.6GB | - | 3 | - | - | 3 | - | 3 |
| 72.8GB | - | 2 | 1 | - | 2 | 1 | 4 |
| 91GB | - | 1 | 2 | - | 1 | 2 | - |
| 109.2GB | - | 2 | 2 | - | 2 | 2 | - |
| 127.4GB | - | 1 | 3 | - | 1 | 3 | - |
| 145.6GB[3] | - | - | 4 | - | - | 4 | - |

This table does not represent all possible HDD configurations.
1. Select a total storage row then add the quantity of HDDs from all columns in an RPM range. Total Internal Storage listed is within +/- 0.2 GB unless otherwise noted.
2. xSeries 220 ICA ships standard with one 18.2GB 10,000rpm nonhot-swap HDD.
3. Requires removal of the standard 18.2GB 10,000rpm HDD. Not supported due to software preload.

| Part Number | Description | RPM | Height | Non-Hot-Swap Models | |
|---|---|---|---|---|---|
| | | | | Bays Supported | Maximum Quantity |
| | **Non-Hot-Swap Ultra160 Hard Disk Drives (HDD)[1]** | | | | |
| 00N8204 | 9.1GB 7200rpm Ultra160 SCSI HDD | 7200 | SL | 4 … 7 | 4 |
| 00N8205 | 18.2GB 7200rpm Ultra160 SCSI HDD | 7200 | SL | 4 … 7 | 4 |
| 00N8206 | 36.4GB 7200rpm Ultra160 SCSI HDD | 7200 | SL | 4 … 7 | 4 |
| 00N8207 | 9.1GB 10,000rpm Ultra160 SCSI HDD | 10000 | SL | 4 … 7 | 4 |
| 00N8208 | 18.2GB 10,000rpm Ultra160 SCSI HDD | 10000 | SL | 4 … 7 | 4 |
| 00N8209 | 36.4GB 10,000rpm Ultra160 SCSI HDD | 10000 | SL | 4 … 7 | 4 |
| 19K0658 | 18.2GB 15,000rpm Ulltra160 SCSI HDD | 15000 | SL | 4 … 7 | 4 |
| | **External Storage Expansion Units[2]** | **Form Factor** | | | |
| 35311RU | EXP300 Storage Expansion Unit[3] | Rack (3U) | | | |
| 09N7296 | EXP300 Rack-to-Tower Conversion Kit | - | | | |

Note: Assuming adequate network bandwidth, adding HDD options has the greatest impact on forward proxy performance.
1. Nonhot-swap HDDs are supported in bays 4 … 7 of nonhot-swap models.
2. Not supported by the onboard SCSI controller. Select an optional SCSI controller then refer to Appendix D: Cables - Storage Units - Controllers to confirm the controller supports the desired External Storage Expansion Unit and to select a supported cable. For HDD or other expansion unit options, see the specific expansion unit section.
3. EXP300 includes a single 2M Ultra2 SCSI cable and dual hot-swap 500W redundant power supplies, each with its own power cord. To convert an EXP300 to a tower form factor, EXP300 Rack-to-Tower Conversion Kit (P/N 09N7296) is required.



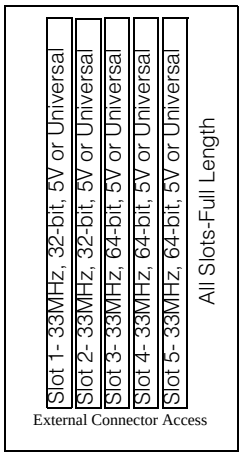

| Bay | Form Factor | Height | Front Access | Usage |
|---|---|---|---|---|
| 1 | 133mm (5.25in) | HH | yes | IDE CD-ROM |
| 2 | 133mm (5.25in) | HH | yes | open[1] |
| 3 | 89mm (3.5in) | SL | yes | Floppy |
| 4 | 89mm (3.5in) | SL | yes | open |
| 5 | 89mm (3.5in) | SL | yes | 18.2GB HDD |
| 6 … 7 | 89mm (3.5in) | SL | yes | open |

1. Supports removable media devices only. Hard drives are not supported.

## xSeries 220 ICA I/O Options

| Part Number | Description | Adapter Length | PCI Support | Slots Supported[1] |
|---|---|---|---|---|
| | **Storage Controllers[2]** | | | |
| 19K4646 | PCI Wide Ultra160 SCSI Adapter[3] | Half | 32-bit | 1 … 5 |
| 02K3454 | PCI Fast/Wide Ultra SCSI Adapter[7] | Half | 32-bit | 1 … 5 |
| | **Networking[4]** | | | |
| | **Ethernet[5]** | | | |
| 09N9901 | 10/100 EtherLink Server Adapter by 3Com | Half | 32-bit | 1 … 5 |
| 19K4401 | Netfinity Gigabit Ethernet Adapter (copper) | Half | 32/64-bit | 1 … 5 |
| 06P3601 | 10/100 Ethernet Server Adapter[6] | Half | 32-bit | 1 … 5 |
| 06P3701 | Gigabit Ethernet SX Server Adapter (fiber) | Half | 32/64-bit | 1 … 5 |
| | **Token Ring** | | | |
| 34L0701 | Token-Ring 16/4 PCI Adapter 2 with Wake on LAN[6] | Half | 32-bit | 1 … 5 |
| 34L5001 | 16/4 Token-Ring PCI Management Adapter[6] | Half | 32-bit | 1 … 5 |
| 34L5201 | High-Speed 100/16/4 Token-Ring PCI Management Adapter[6] | Half | 32-bit | 1 … 5 |
| | **Systems Management** | | | |
| 09N7585 | Remote Supervisor Adapter | Half | 32-bit | 2 |

-


Slot 1- 33MHz, 32-bit, 5V or Universal
Slot 2- 33MHz, 32-bit, 5V or Universal
Slot 3- 33MHz, 64-bit, 5V or Universal
Slot 4- 33MHz, 64-bit, 5V or Universal
Slot 5- 33MHz, 64-bit, 5V or Universal
All Slots-Full Length
External Connector Access

1. The xSeries 220 ICA has five full-length, 33MHz PCI expansion slots, three 64-bit and two 32-bit.
2. xSeries 220 ICA has an integrated Ultra160 SCSI Controller with a single internal channel and includes a five-drop, multi-mode terminated LVD SCSI cable.
3. PCI Wide Ultra160 SCSI Adapter (P/N 19K4646) provides a single channel with one internal connector and a five-drop multi-mode terminated LVD SCSI cable and one external connector with a 0.8mm VHDCI connector. Only one of the two connectors may be utilized.
4. The xSeries 220 includes an integrated full-duplex, 10/100Mbps Ethernet controller.
5. In a fault-tolerant networking environment, using the fault-tolerant software delivered with the Ethernet adapters of a single manufacturer is recommended. Installing fault-tolerant solutions provided by multiple manufacturers may cause failures if the intermediate drivers provided with the adapters are not compatible. The onboard Ethernet is Intel-based, which is compatible with the two Intel-based optional Ethernet adapters (P/N 06P3601, 06P3701).
6. The Wake on LAN™ feature of this adapter is supported only in slot one.
7. PCI Fast/Wide Ultra SCSI Adapter (P/N 02K3454) provides one external 68-pin high density connector that supports external SCSI devices such as tape enclosures.

## xSeries 220 ICA Power, Monitors & Accessories

| Part Number | Description |
|---|---|
| | **Power[1]** |
| | **Uninterruptible Power Supply (UPS)[2]** |
| 94G3134 | APC Smart-UPS 700 |
| 94G3135 | APC Smart-UPS 1000 |
| 94G3136 | APC Smart-UPS 1400 |
| 94G6674 | APC Smart-UPS 1400RMB[3] |
| 94G6676 | APC Smart-UPS 3000RMB[3] |
| 37L6861 | APC Smart-UPS 5000RMB[4] |
| | **Monitors[5]** |
| 633347N | E51 Color Monitor 15in (350mm, 13.8in Viewable Image Size), stealth black[6] |
| 6331N2N | E54 Color Monitor 15in (350mm, 13.8in Viewable Image Size), stealth black[6] |
| 6332J1N | E74 Color Monitor 17in (403mm, 15.9in Viewable Image Size), stealth black[6] |
| 66274AN | G78 Color Monitor 17in (406.4mm, 16in Viewable Image Size), stealth black[6] |
| 9511AG4 | T540 Flat Panel Color Monitor 15in (381mm, 15in viewable image), stealth black[7] |

1. The xSeries 220 ICA includes a 330W voltage sensing power supply and a single line cord.
2. For runtimes and UPS attributes see Appendix C: UPS Runtime Estimate.
3. Height is 3U. See Rack Cabinets and Options section for supported IBM racks.
4. Height is 5U. See Rack Cabinets and Options section for supported IBM racks.
5. The xSeries 220 ICA includes an integrated SVGA controller (S3 Savage4 Chipset) with 8MB of video memory.
6. Installation within a rack requires optional Monitor Compartment (P/N 94G7444).
7. Installation within a rack requires optional Netfinity Flat Panel Monitor Rack Mount Kit II (P/N 37L6888) and Netfinity Rack Keyboard Tray (P/N 28L4707). A space saver keyboard may coexist within the same 28L4707 keyboard tray.

| Part Number | Description |
|---|---|
| | **Conversion Kits** |
| 09N4300 | 4Ux20D Tower-to-Rack Kit |
| | **Rack and NetBAY[1]** |
| | Refer to the Rack Cabinets and Options section for information concerning IBM racks and rack-supported devices. |
| | **Keyboard and Mouse[2]** |
| 28L3644 | Space Saver II Keyboard[3, 4] |
| 01K1260 | TrackPoint IV 104-key Black Keyboard[4, 5] |
| 28L3621 | Preferred Keyboard (stealth black)[5] |
| 28L3673 | Sleek 2-button Stealth Black Mouse |

1 Rack installation of an xSeries 220 ICA requires 4Ux20D Tower-to-Rack Kit (P/N 09N4300) and one of the racks listed in the Rack Cabinets and Options section.
2. The xSeries 220 ICA includes both a mouse and nonspace saver keyboard.
3. Installation within a rack requires optional keyboard tray (P/N 28L4707), which stows in ready-to-use position.
4. Advanced TrackPoint IV features are not available on IBM xSeries or Netfinity systems.
5. Installation within a rack requires optional keyboard tray (P/N 28L4707). This keyboard cannot share a keyboard tray with a flat panel display.

# IBM xSeries 330 ICA

| Part Number | Processor Speed (MHz)[2] | Number of Processors (Std/Max) | L2 ECC Cache (KB) | Memory (Std/Max) (R = RDIMM) | Form Factor | Power Supply Quantity (Std/Max) | Hot-Swap (Power, Slots, HDD, Fans) | Redundancy (Optional, Standard) | Adv System Management Processor | Onboard Ethernet (Mbps) | SCSI Controller (Dual, Ultra, RAID)[3] | Removable Media Bays (Total/Avail) | Internal Hard Disk Drive (Std/Max) | CD-ROM (IDE)[4] | Bays (Total/Avail) | Slots (Total/Avail) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **xSeries 330 ICA At-A-Glance** | | | | | | | | | | | | | | | | |
| 8654-37X[1, 5] | 866 | 1/2 | 256 | 384MB(R)/4GB | Rack (1U) | 1/1 | H | - | Y | 2 x 10/100 | U160 | - | 36.4GB/72.8GB | 24X-10X | 4/0 | 2/2 |
| 8654-38X[1, 6] | 866 | 1/2 | 256 | 1GB(R)/4GB | Rack (1U) | 1/1 | H | - | Y | 2 x 10/100 | U160 | - | 18.2GB/72.8GB | 24X-10X | 4/1 | 2/2 |

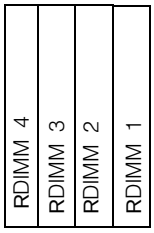
1. Housed in a 19in rack-mountable drawer and ships standard without a keyboard or mouse. See Rack Cabinets and Options section for supported IBM racks.These appliances are preconfigured and optimized to support specific Internet applications per the Volera Excelerator V2.0 Internet Caching software licensing structure. Performance can be enhanced by installing additional memory, 15Krpm HDD storage, gigabit Ethernet adapters and additional or faster processors (impact of processor speed less significant than other options).
2. Intel Pentium III processor with advanced transfer L2 cache and 133MHz FSB.
3. xSeries 330 ICA has an integrated single-channel Ultra160 SCSI Controller.
4. Variable read rate. Actual playback speed will vary and is often less than the maximum possible.
5. Workgroup-tier ICA forward proxy software preload designed for departments ranging up to 250 users.
6. Workgroup-tier ICA reverse proxy software preload designed for small- to mid-range applications handling up to 3,500 requests per second.

## xSeries 330 ICA Processors

| Part Number | Processor Upgrades | SMP Support[1] | Processor Speed Upgrade[2] |
|---|---|---|---|
| 10K3806 | 866MHz Upgrade with 133MHz FSB and 256KB Advanced Transfer Cache Pentium III Processor | 37X, 38X | - |
| 10K0052 | 933MHz Upgrade with 133MHz FSB and 256KB Advanced Transfer Cache Pentium III Processor | - | 37X, 38X |
| 10K0053 | 1GHz Upgrade with 133MHz FSB and 256KB Advanced Transfer Cache Pentium III Processor | - | 37X, 38X |

1. One additional processor may be installed, providing a maximum of two. All processors must be identical in type, speed, and cache size.
2. Requires removal of the standard processor. A maximum of two processors may be installed. Optimal performance is achieved with the standard processor, i.e., upgrading the processor does not necessarily increase performance. Upgrades may require a BIOS update. To obtain the latest Flash BIOS, access www.pc.ibm.com/support and enter machine "Type-Model" in Quick Path. Select "Downloadable files" then "BIOS."

## xSeries 330 ICA Memory




| Part Number | Memory Description[1] |
|---|---|
| | |
| 33L3142 | 128MB, 133MHz SDRAM ECC RDIMM II |
| 33L3144 | 256MB, 133MHz SDRAM ECC RDIMM II |
| 33L3146 | 512MB, 133MHz SDRAM ECC RDIMM II |
| 33L3152 | 1GB, 133MHz SDRAM ECC RDIMM II |

Memory amount has the greatest impact on reverse proxy performance.
1. Memory RDIMMs must be installed in sequence from RDIMM connector 1 through connector 4. RDIMM size is not relevant.

| Total Memory[1] | Quantity of RDIMMs Added | | | |
|---|---|---|---|---|
| | 128MB (33L3142) | 256MB (33L3144) | 512MB (33L3146) | 1GB (33L3152) |
| 384MB[2] | 1 | 1 | - | - |
| 512MB | 2 | 1 | - | - |
| 640MB | 3 | 1 | - | - |
| 768MB | 2 | 2 | - | - |
| 1152MB | 1 | 2 | 1 | - |
| 1024MB[3] | - | - | 2 | - |
| 1408MB | 1 | 1 | 2 | - |
| 2304MB[4] | - | 1 | 2 | 1 |
| 2432MB[5] | 1 | 1 | - | 2 |
| 3072MB[4] | - | - | 2 | 2 |
| 4096MB (max)[6] | - | - | - | 4 |

This table does not represent all possible memory configurations. Memory modules may vary in price per MB. Selection of smaller RDIMMs may provide a more cost-effective alternative to using larger RDIMMs.
1. Network operating systems may limit the maximum amount of addressable memory. See operating system specifications for further information.
2. Model 37X ships standard with this memory amount and configuration.
3. Model 38X ships standard with this memory amount and configuration. Model 37X would require removing the standard RDIMMs for this configuration.
4. Model 37X requires removing one or both standard RDIMMs for this configuration.
5. Model 38X requires removing the standard RDIMMs for this configuration.
6. Requires removal of standard memory.

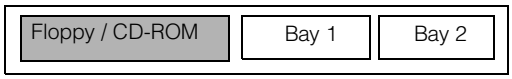
## xSeries 330 ICA Hard Disk Drive (HDD) Storage

| SCSI Models | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Total Int Storage[1]** | **7200RPM HDDs** | | | **10,000RPM HDDs** | | | **15,000RPM HDDs** | |
| | **9.1GB (37L7201)** | **18.2GB (37L7202)** | **36.4GB (37L7203)** | **9.1GB (37L7204)** | **18.2GB (37L7205)** | **36.4GB (37L7206)** | **9.1GB (19K0655)** | **18.2GB (19K0656)** |
| 18.2GB[2] | - | - | - | - | 1 | - | - | - |
| 27.3GB | 1 | 1 | - | 1 | 1 | - | 1 | 1 |
| 36.4GB[3] | - | 2 | - | - | 2 | - | - | 2 |
| 54.6GB | - | 1 | 1 | - | 1 | 1 | - | - |
| 72.8GB[4] (max) | - | - | 2 | - | - | 2 | - | - |

Assuming adequate network bandwidth, HDD storage typically has the greatest impact on forward proxy performance.
This table does not represent all possible HDD configurations.

1. Select a total storage row then add the quantity of HDDs from all columns in an RPM range. Total Internal Storage listed is within +/- 0.2GB unless otherwise noted.
2. Model 38X ships standard with one 18.2GB 10,000rpm HDD.
3. Model 37X ships standard with two 18.2GB 10,000rpm HDDs.
4. Requires removal of standard HDD installed in bay one. Maximum configuration not recommended due to software preload on boot disk in bay one.






| Bay | Form Factor | Height | Front Access | Usage |
|---|---|---|---|---|
| 1[1] | HS or 89mm (3.5in) | SL | Yes | 18.2GB HDD |
| 2 | HS or 89mm (3.5in) | SL | Yes | Open[2] |

1. Boot drive should be located in bay 1.
2. Some models include two standard HDDs.

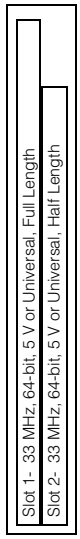
| Part Number | Description | RPM | Height | Bays Supported | Max Qty |
|---|---|---|---|---|---|
| **Hot-swap Utra160 HDDs** | | | | | |
| 37L7201 | 9.1GB Ultra160 SCSI Hot-Swap SL HDD | 7200 | SL | 1 … 2 | 2 |
| 37L7202 | 18.2GB Ultra160 SCSI Hot-Swap SL HDD | 7200 | SL | 1 … 2 | 2 |
| 37L7203 | 36.4GB Ultra160 SCSI Hot-Swap SL HDD | 7200 | SL | 1 … 2 | 2 |
| 37L7204 | 9.1GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD | 10000 | SL | 1 … 2 | 2 |
| 37L7205 | 18.2GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD | 10000 | SL | 1 … 2 | 2 |
| 37L7206 | 36.4GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD | 10000 | SL | 1 … 2 | 2 |
| 19K0655 | 9.1GB 15Krpm Ultra160 SCSI Hot-Swap HDD | 15000 | SL | 1 … 2 | 2 |
| 19K0656 | 18.2GB 15Krpm Ultra160 SCSI Hot-Swap HDD | 15000 | SL | 1 … 2 | 2 |
| **External Storage Expansion Units[1]** | | **Form Factor** | | | |
| 35311RU | Netfinity EXP300 Storage Expansion Unit[2] | Rack (3U) | | | |

1. xSeries 330 ICA does not include an external SCSI connector. To configure a SCSI storage device, select an optional SCSI controller then refer to Appendix D: Cables - Storage Units - Controllers to confirm the controller supports the desired External Storage Expansion Unit and to select a supported cable. For HDD or other expansion unit options, see the specific expansion unit section.
2. EXP300 includes a single 2M Ultra2 SCSI cable and dual hot-swap 500W redundant power supplies, each with its own power cord.

## xSeries 330 ICA I/O Options

| Part Number | Description | Adapter Length | PCI Support | Slots Supported[2] |
|---|---|---|---|---|
| | **Storage Controllers[1]** | | | |
| 19K4646 | PCI Wide Ultra160 SCSI Adapter[3] | Half | 32-bit | 1, 2 |
| 02K3454 | PCI Fast/Wide Ultra SCSI Adapter[4] | Half | 32-bit | 1, 2 |
| | **Networking[5]** | | | |
| | **Ethernet[6]** | | | |
| 19K4401 | Netfinity Gigabit Ethernet Adapter (copper) | Half | 64-bit | 1, 2 |
| 06P3601 | 10/100 Ethernet Server Adapter[7] | Half | 32-bit | 1, 2 |
| 06P3701 | Gigabit Ethernet SX Server Adapter (fiber) | Half | 64-bit | 1, 2 |
| | **Token Ring** | | | |
| 34L5001 | 16/4 Token-Ring PCI Management Adapter[7] | Half | 32-bit | 1, 2 |
| 34L5201 | High-Speed 100/16/4 Token-Ring PCI Management Adapter[7] | Half | 32-bit | 1, 2 |

1. xSeries 330 ICA has an integrated single-channel Ultra160 SCSI Controller.
2. A 64-bit adapter installed into a 32-bit slot will transfer data at 32-bit rates. Adapters rated at 66MHz will operate at 33MHz when installed in a 33MHz slot.
3. PCI Wide Ultra160 SCSI Adapter (P/N 19K4646) provides a single channel with one internal connector and one external 0.8mm VHDCI connector. Support for external SCSI devices only. A five-drop terminated LVD SCSI cable is included but not supported for use in this server.
4. PCI Fast/Wide Ultra SCSI Adapter (P/N 02K3454) provides one external 68-pin high density connector that supports external SCSI devices such as tape enclosures.
5. xSeries 330 ICA includes dual full-duplex, 10/100Mbps Ethernet controllers.
6. In a fault-tolerant networking environment, using the fault-tolerant software delivered with the Ethernet adapters of a single manufacturer is recommended. Installing fault-tolerant solutions provided by multiple manufacturers may cause failures if the intermediate drivers provided with the adapters are not compatible. The onboard Ethernet is Intel-based, which is compatible with the two Intel-based optional Ethernet adapters (P/N 06P3601, 06P3701).
7. The Wake on LAN function of this option is not supported by this server.



Exterior Connector Access

## xSeries 330 ICA Power, Monitors & Accessories

| Part Number | Description |
|---|---|
| | **Power[1]** |
| | **Uninterruptible Power Supply (UPS)[2]** |
| 94G6674 | APC Smart-UPS 1400RMB[3] |
| 94G6676 | APC Smart-UPS 3000RMB[3] |
| | **Monitors[4]** |
| 06P4792 | Cable Chain Technology Cable Kit[5] |
| 633347N | E51 Color Monitor 15in (350mm, 13.8in Viewable Image Size), stealth black[6] |
| 6331N2N | E54 Color Monitor 15in (350mm, 13.8in Viewable Image Size), stealth black[6] |
| 6332J1N | E74 Color Monitor 17in (403mm, 15.9in Viewable Image Size), stealth black[6] |
| 66274AN | G78 Color Monitor 17in (406.4mm, 16in Viewable Image Size), stealth black[6] |
| 9511AG4 | T540 Flat Panel Color Monitor 15in (381mm, 15in viewable image), stealth black[7] |

1. The xSeries 330 ICA includes a worldwide, voltage sensing 200W power supply with auto restart and two 9ft line cords. One line cord contains a 110V NEMA 5-15P connector while the other contains an IEC 320 C14 for attachment to a high voltage PDU or UPS.
2. For runtimes and UPS attributes see Appendix C: UPS Runtime Estimate.
3. Height is 3U. See Rack Cabinets and Options section for supported IBM racks.
4. xSeries 330 ICA uses an SVGA controller (S-3 Savage4 chipset) with 8MB of video memory.
5. A Cable Chain Technology (C2T) Cable Kit (P/N 06P4792) is required for the attachment of console devices to one or multiple chained xSeries 330s. The kit contains a 2M (6.5ft) breakout cable for attachment to a keyboard. mouse and monitor as well as a 2M (6.5ft) chaining cable for connecting two xSeries 330s together when the standard 260mm (10in) chaining cable is not long enough. A maximum of 42 xSeries 330s are supported in a single chain. No more than one C2T Cable kit may be used. If the last server in the chain is connected to a console switch rather than directly to a monitor, a console cable (P/N 09N4293 or 94G7447) is required in addition to the C2T Kit.
6. Installation within a rack requires optional Monitor Compartment (P/N94G7444).
7. Installation within a rack requires optional Netfinity Flat Panel Monitor Rack Mount Kit II (P/N 37L6888) and Netfinity Rack Keyboard Tray (P/N 28L4707). A space saver keyboard may coexist within the same 28L4707 keyboard tray.

| Part Number | Description |
|---|---|
| | **Rack and NetBAY[1, 2]** |
| | Refer to the Rack Cabinets and Options section for information concerning IBM racks and rack-supported devices. |
| | **Keyboard and Mouse[3]** |
| 06P4792 | Cable Chain Technology Cable Kit[4] |
| 28L3644 | Space Saver II Keyboard[5, 6] |
| 28L3621 | Preferred Keyboard (stealth black)[7] |
| 28L3673 | Sleek 2-button Stealth Black Mouse |

1. xSeries 330 ICA is housed in a 19in rack-mountable drawer and requires one of the racks listed in the Rack Cabinets and Options section.
2. Note limitations and restrictions required for adequate cooling in the Rack Cabinets and Options section. If non-IBM racks are to be used, assure that both the front and rear doors offer a minimum of 48% open area uniformly distributed and in line with installed servers. A clearance of 51 to 64mm (2 to 2.5in) must be maintained between the front door and the system unit's front bezel. The rear door must maintain the same or greater clearance.
3. xSeries 330 ICA supports rack configurations only and ships without a keyboard or mouse.
4. A Cable Chain Technology (C2T) Cable Kit (P/N 06P4792) is required for the attachment of console devices to one or multiple chained xSeries 330s. The kit contains a 2M (6.5ft) breakout cable for attachment to a keyboard. mouse and monitor as well as a 2M (6.5ft) chaining cable for connecting two xSeries 330s together when the standard 260mm (10in) chaining cable is not long enough. A maximum of 42 xSeries 330s are supported in a single chain. No more than one C2T Cable kit may be used. If the last server in the chain is connected to a console switch rather than directly to a monitor, a console cable (P/N 09N4293 or 94G7447) is required in addition to the C2T Kit.
5. Installation within a rack requires optional keyboard tray (P/N 28L4707), which stows in ready-to-use position.
6. Advanced TrackPoint IV features are not available on IBM xSeries or Netfinity systems.
7. Installation within a rack requires optional keyboard tray (P/N 28L4707). This keyboard cannot share a keyboard tray with a flat panel display.

# IBM xSeries 340 ICA

## xSeries 340 ICA At-A-Glance

| Part Number | Processor Speed (MHz)[2] | Number of Processors (Std/Max) | L2 ECC Cache (KB) | Memory (Std/Max) (R = RDIMM) | Form Factor | Power Supply Quantity (Std/Max) | Hot-Swap (Power, Slots, HDD, Fans) | Redundancy (Optional, Standard) | Adv System Management Processor | Onboard Ethernet (Mbps) | SCSI Controller (Dual, Ultra, RAID)[4] | Removable Media Bays (Total/Avail) | Internal Hard Disk Drive (Std/Max) | CD-ROM (IDE)[7] | Bays (Total/Avail) | Slots (Total/Avail) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8656-45X[1, 8] | 866 | 1/2 | 256 | 768MB(R)/4GB | Rack (3U) | 1/2 | P, H, F | O - Power[3] S - Fans | Y | 10/100 | D,U160 | 4/2[5] | 54.6GB/ 109.2GB | 24X-10X | 7/2 | 5/5 |
| 865646X[1, 9] | 866 | 1/2 | 256 | 1.5GB(R)/4GB | Rack (3U) | 2/2 | P, H, F | S - Power S - Fans | Y | 10/100 | D,U160 | 4/0[5] | 109.2GB/ 218.4GB[6] | 24X-10X | 8/0[6] | 5/5 |
| 8656-47X[1, 10] | 866 | 1/2 | 256 | 4GB(R)/4GB | Rack (3U) | 1/2 | P, H, F | O - Power[3] S - Fans | Y | 10/100 | D,U160 | 4/2[5] | 54.6GB/ 109.2GB | 24X-10X | 7/2 | 5/5 |

1. Housed in a 19in rack-mountable drawer and ships standard without a keyboard or mouse. See Rack Cabinets and Options section for supported IBM racks.These appliances are preconfigured and optimized to support specific Internet applications per the Volera Excelerator V2.0 Internet Caching software licensing structure. Performance can be enhanced by installing additional memory, 15Krpm HDD storage, gigabit Ethernet adapters and additional or faster processors (impact of processor speed less significant than other options).
2. Intel Pentium III processor with advanced transfer L2 cache and 133MHz FSB.
3. Power supply redundancy requires installation of optional 270W Hot-Swap Redundant Power Supply (P/N 37L6880).
4. xSeries 340 ICA includes a dual-port, dual-channel Ultra160 SCSI controller for internal use only. No standard external port is available. Due to xSeries 340 ICA's low profile, some adapters with connectors on the top edge may not have sufficient clearance to attach a cable.
5. xSeries 340 ICA includes two available removable media bays that can be converted to three slim-line (SL) hot-swap bays with the addition of optional 3-pack Ultra160 Hot-Swap Expansion Kit (P/N 33L5050), doubling internal hard disk drive storage capacity. Some models ship standard with the 3-Pack Expansion Kit already installed.
6. Requires installation of optional IBM 3-Pack Ultra160 Hot-Swap Expansion Kit (P/N 33L5050), which converts the two available removable media bays into three slim-line (SL) hot-swap bays.
7. Variable read rate. Actual playback speed will vary and is often less than the maximum possible.
8. Department-tier ICA forward proxy software preload designed for enterprises with up to 500 users.
9. Enterprise-tier ICA forward proxy software preload designed for ISPs and large enterprises with up to 1,000 users.
10. Enterprise-tier ICA reverse proxy software preload designed for commercial or large-site operations handling up to 20,000 requests per second.

## xSeries 340 ICA Processors

| Part Number | Processor Upgrades | SMP Support[1] | Processor Speed Upgrade[2] |
|---|---|---|---|
| 19K4630 | Netfinity 866MHz 133MHz FSB/256KB Upgrade with Pentium III Processor | 4xX | - |
| 19K4631 | Netfinity 933MHz 133MHz FSB/256KB Upgrade with Pentium III Processor | - | 4xX |
| 19K4640 | 1GHz Upgrade with 133MHz FSB and 256KB Advanced Transfer Cache Pentium III Processor | - | 4xX |

1. One additional processor may be installed, providing a maximum of two. All processors must be identical in type, speed, and cache size.
2. Requires removal of the standard processor. A maximum of two processors may be installed. Optimal performance is achieved with the standard processor, i.e., upgrading the processor does not necessarily increase performance. Upgrades may require a BIOS update. To obtain the latest Flash BIOS, access www.pc.ibm.com/support and enter machine "Type-Model" in Quick Path. Select "Downloadable files" then "BIOS."

## xSeries 340 ICA Memory

| |
|---|
| RDIMM Socket 4 |
| RDIMM Socket 3 |
| RDIMM Socket 2 |
| RDIMM Socket 1 |

Recommended order of installation:
Slot 1-2-3-4

| Part Number | Memory Description[1] |
|---|---|
| 33L3123 | 128MB, 133MHz SDRAM ECC RDIMM II |
| 33L3125 | 256MB, 133MHz SDRAM ECC RDIMM II |
| 33L3127 | 512MB, 133MHz SDRAM ECC RDIMM II |
| 33L3129 | 1GB, 133MHz SDRAM ECC RDIMM II |

Memory amount has the greatest impact on reverse proxy performance.
1. The recommended order of installation is in sequence from Socket 1 to Socket 4. Memory size is not a factor.

| Total Memory[1] | Quantity of RDIMMs Added | | | |
|---|---|---|---|---|
| | 128MB (33L3123) | 256MB (33L3125) | 512MB (33L3127) | 1GB (33L3129) |
| 768MB[2] | | 1 | 1 | - |
| 896MB | 1 | 1 | 1 | - |
| 1536MB[3] | - | - | 1 | 1 |
| 1920MB | 1 | 1 | 1 | 1 |
| 2176MB | - | 2 | 1 | 1 |
| 2432MB | - | 1 | 2 | 1 |
| 2816MB | - | 1 | 1 | 2 |
| 3072MB[4] | - | - | 2 | 2 |
| 3584MB[4] | - | - | 1 | 3 |
| 4096MB (max)[5] | - | - | - | 4 |

This table does not represent all possible memory configurations. Memory modules may vary in price per MB. Selection of smaller RDIMMs may provide a more cost-effective alternative to using larger RDIMMs.
1. Network operating systems may limit the maximum amount of addressable memory. See operating system specifications for further information.
2. Model 45X ships standard with this memory amount and configuration.
3. Model 46X ships standard with this memory amount and configuration. Not applicable to Model 45X.
4. Model 45X requires removal of one standard RDIMM to support this configuration.
5. Requires removal of standard memory for models 45X and 46X. Standard for model 47X..

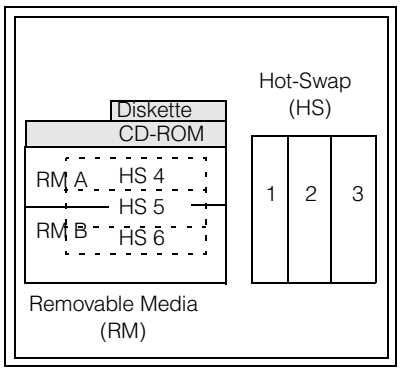
## xSeries 340 ICA Hard Disk Drive (HDD) Storage

| Total Int Storage[1] | 7200RPM HDDs | | | 10,000RPM HDDs | | | 15,000RPM HDDs | |
|---|---|---|---|---|---|---|---|---|
| | 9.1GB (37L7201) | 18.2GB (37L7202) | 36.4GB (37L7203) | 9.1GB (37L7204) | 18.2GB (37L7205) | 36.4GB (37L7206) | 9.1GB (19K0655) | 18.2GB (19K0656) |
| 54.6GB[2] | - | - | - | - | 3 | - | - | - |
| 91GB[3] | - | 1 | 2 | - | 1 | 2 | - | - |
| 109.2GB[4] | - | 6 | - | - | 6 | - | - | 6 |
| 145.6GB[3] | - | 4 | 2 | - | 4 | 2 | - | - |
| 182GB[3] | - | 2 | 4 | - | 2 | 4 | - | - |
| 200.2GB[5] | - | 1 | 5 | - | 1 | 5 | - | - |

Assuming adequate network bandwidth, HDD storage typically has the greatest impact on forward proxy performance.
This table does not represent all possible HDD configurations.
1. Select a total storage row then add the quantity of HDDs from all columns in an RPM range. Total Internal Storage listed is within +/- 0.2GB unless otherwise noted.
2. Model 45X and 47X ship standard with three 18.2GB 10,000rpm HDDs.
3. Requires removal of one or more standard HDDs.
4. Model 46X ships standard with six 18.2GB 10,000rpm HDDs and IBM 3-Pack Ultra160 Hot-Swap Expansion Kit installed.
5. Maximum internal storage of 218.4GB can only be achieved by removing all six standard HDDs, which is not recommended due to software preload on boot disk.

| Bay | Form Factor | Height | Front Access | Usage |
|---|---|---|---|---|
| - | 89mm (3.5in) | - | Yes | Diskette |
| - | 133mm (5.25in) | - | Yes | IDE CD-ROM |
| 1 … 3 | HS | SL[1] | Yes | HDD |
| A, B | 133mm (5.25in) | HH[2] | Yes | HDD |
| 4 … 6[3] | HS | SL[1] | Yes | HDD |

1. Half-High devices are NOT supported.
2 By installing xSeries 3-Pack Ultra160 Hot-Swap Expansion Kit (P/N 33L5050), bays A and B are transformed into three SL hot-swap bays 4 … 6.
3. Some models ship with six 18.2GB HDDs.

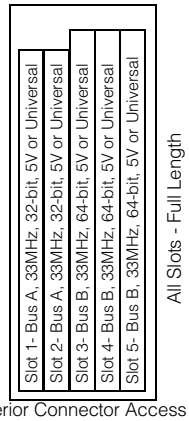



| Part Number | Description | RPM | Height | Bays Supported[1] | Max Qty[1] |
|---|---|---|---|---|---|
| | **Ultra160 HDDs** | | | | |
| 37L7201 | 9.1GB Ultra160 SCSI Hot-Swap SL HDD | 7200 | SL | 1 … 6 | 6 |
| 37L7202 | 18.2GB Ultra160 SCSI Hot-Swap SL HDD | 7200 | SL | 1 … 6 | 6 |
| 37L7203 | 36.4GB Ultra160 SCSI Hot-Swap SL HDD | 7200 | SL | 1 … 6 | 6 |
| 37L7204 | 9.1GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD | 10000 | SL | 1 … 6 | 6 |
| 37L7205 | 18.2GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD | 10000 | SL | 1 … 6 | 6 |
| 37L7206 | 36.4GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD | 10000 | SL | 1 … 6 | 6 |
| 19K0655 | 9.1GB 15Krpm Ultra160 SCSI Hot-Swap HDD | 15000 | SL | 1 … 6 | 6 |
| 19K0656 | 18.2GB 15Krpm Ultra160 SCSI Hot-Swap HDD | 15000 | SL | 1 … 6 | 6 |
| | **Associated Options** | | | | |
| 33L5050 | IBM 3-Pack Ultra160 Hot-Swap Expansion Kit[2] | - | 3 x SL | 4 … 6 | - |
| | **External Storage Expansion Units[3]** | **Form Factor** | | | |
| 35311RU | EXP300 Storage Expansion Unit[4] | Rack (3U) | | | |

1. xSeries 340 ICA ships with Bays 1 … 3 enabled for Models 45X and 47X. Model 47X is shipped with six bays enabled, which includes installation of IBM 3-Pack Ultra160 Hot-Swap Expansion Kit (P/N 33L5050).
2. IBM 3-Pack Ultra160 Hot-Swap Expansion Kit (P/N 33L5050) includes a hot-swap backplane and associated components for two cabling options. The backplane may be cabled directly to the second integrated SCSI channel or supported by the same SCSI channel as the standard backplane through the use of an included repeater card.
3. To configure a SCSI storage device, select an optional SCSI controller then refer to Appendix D: Cables - Storage Units - Controllers to confirm the controller supports the desired External Storage Expansion Unit and to select a supported cable. For HDD or other expansion unit options, see the specific expansion unit section.
4. EXP300 includes a single 2M Ultra2 SCSI cable and dual hot-swap 500W redundant power supplies, each with its own power cord.

## xSeries 340 ICA I/O Options

| Part Number | Description | Adapter Length | PCI Support | Slots Supported[2] |
|---|---|---|---|---|
| | **Storage Controllers[1]** | | | |
| 19K4646 | PCI Wide Ultra160 SCSI Adapter[3] | Half | 32-bit | 1 … 5 |
| 02K3454 | PCI Fast/Wide Ultra SCSI Adapter[4] | Half | 32-bit | 1 … 5 |
| | **Networking[5]** | | | |
| | **Ethernet[6]** | | | |
| 19K4401 | Netfinity Gigabit Ethernet Adapter (copper) | Half | 64-bit | 1 … 5 |
| 06P3601 | 10/100 Ethernet Server Adapter[7] | Half | 32-bit | 1 … 5 |
| 06P3701 | Gigabit Ethernet SX Server Adapter (fiber) | Half | 64-bit | 1 … 5 |
| 09N9901 | 10/100 EtherLink Server Adapter by 3Com | Half | 32-bit | 1 … 5 |
| | **Token Ring[7]** | | | |
| 34L0701 | Token-Ring 16/4 PCIAdapter 2 with Wake on LAN[7] | Half | 32-bit | 1 … 5 |
| 34L5001 | 16/4 Token-Ring PCI Management Adapter[7] | Half | 32-bit | 1 … 5 |
| 34L5201 | High-Speed 100/16/4 Token-Ring PCI Management Adapter[7] | Half | 32-bit | 1 … 5 |


Slot 1- Bus A, 33MHz, 32-bit, 5V or Universal
Slot 2- Bus A, 33MHz, 32-bit, 5V or Universal
Slot 3- Bus B, 33MHz, 64-bit, 5V or Universal
Slot 4- Bus B, 33MHz, 64-bit, 5V or Universal
Slot 5- Bus B, 33MHz, 64-bit, 5V or Universal
All Slots - Full Length
Exterior Connector Access

1. xSeries 340 ICA includes a dual-port, dual-channel Ultra160 SCSI controller for internal use only. No standard external port is available. See "Internal SCSI Cabling" in xSeries 340 section for cabling alternatives. Due to xSeries 340 ICA's low profile, some adapters with connectors on the top edge may not have sufficient clearance to attach a cable.
2. A 64-bit adapter installed into a 32-bit slot will transfer data at 32-bit rates. Adapters rated at 66MHz will operate at 33MHz when installed in a 33MHz slot.
3. PCI Wide Ultra160 SCSI Adapter (P/N 19K4646) provides a single channel with one internal connector, a five-drop multi-mode terminated LVD SCSI cable and one external 0.8mm VHDCI connector. Only one of the two connectors may be utilized.
4. PCI Fast/Wide Ultra SCSI Adapter provides one external 68-pin high density connector. The internal connectors are not accessible due to a cabling interference.
5. xSeries 340 ICA includes a full-duplex, 10/100Mbps Ethernet PCI controller.
6. In a fault-tolerant networking environment, using the fault-tolerant software delivered with the Ethernet adapters of a single manufacturer is recommended. Installing fault-tolerant solutions provided by multiple manufacturers may cause failures if the intermediate drivers provided with the adapters are not compatible. The onboard Ethernet is Intel-based, which is compatible with the two Intel-based optional Ethernet adapters (P/N 06P3601, 06P3701).
7. The Wake on LAN function of this option is not supported by this server.

## xSeries 340 ICA Power, Monitors & Accessories

| Part Number | Description |
|---|---|
| | **Power[1]** |
| 37L6880 | 270W Hot-Swap Redundant Power Supply |
| | **Uninterruptible Power Supply (UPS)[2]** |
| 94G6674 | APC Smart-UPS 1400RMB[3] |
| 94G6676 | APC Smart-UPS 3000RMB[3] |
| 37L6861 | APC Smart-UPS 5000RMB[4] |
| | **Monitors[5]** |
| 633347N | E51 Color Monitor 15in (350mm, 13.8in Viewable Image Size), stealth black[6] |
| 6331N2N | E54 Color Monitor 15in (350mm, 13.8in Viewable Image Size), stealth black[6] |
| 6332J1N | E74 Color Monitor 17in (403mm, 15.9in Viewable Image Size), stealth black[6] |
| 66274AN | G78 Color Monitor 17in (406.4mm, 16in Viewable Image Size), stealth black[6] |
| 9511AG4 | T540 Flat Panel Color Monitor 15in (381mm, 15in viewable image), stealth black[7] |

1. xSeries 340 ICA systems include a single 270W, hot-swap power supply and two 9ft power cords, one high voltage IEC 320-C13 to IEC 320-C14 and one low voltage IEC 320-C13 to NEMA 5-15P. Power supply redundancy can be achieved with the addition of optional 270W Hot-Swap Redundant Supply (P/N 37L6880).
2. For runtimes and UPS attributes see Appendix C: UPS Runtime Estimate.
3. Height is 3U. See Rack Cabinets and Options section for supported IBM racks.
4. Height is 5U. See Rack Cabinets and Options section for supported IBM racks.
5. xSeries 340 ICA uses an SVGA controller (S3 Savage4 chipset) with 8MB of video memory.
6. Installation within a rack requires optional Monitor Compartment (P/N 94G7444).
7. Installation within a rack requires optional Netfinity Flat Panel Monitor Rack Mount Kit II (P/N 37L6888) and Netfinity Rack Keyboard Tray (P/N 28L4707). A space saver keyboard may coexist within the same 28L4707 keyboard tray.

| Part Number | Description |
|---|---|
| **Rack and NetBAY[1]** | |
| | Refer to the Rack Cabinets and Options section for information concerning IBM racks and rack-supported devices. |
| **Keyboard and Mouse[2]** | |
| 28L3644 | Space Saver II Keyboard[3, 5] |
| 28L3621 | Preferred Keyboard (stealth black)[4] |
| 28L3673 | Sleek 2-Button Stealth Black Mouse |

1. xSeries 340 ICA is housed in a 19in rack-mountable drawer and requires one of the racks listed in the Rack Cabinets and Options section.
2. xSeries 340 ICA supports rack configurations only and ships without a mouse or keyboard.
3. Installation within a rack requires optional keyboard tray (P/N 28L4707), which stows in ready-to-use position.
4. Installation within a rack requires optional keyboard tray (P/N 28L4707). This keyboard cannot share a keyboard tray with a flat panel display.
5. Advanced TrackPoint IV features are not available on IBM xSeries or Netfinity systems.

# IBM xSeries 200

| Part Number | Processor Speed (MHz) | Number of Processors (Std/Max) | L2 ECC Cache (KB) | Memory (Std/Max) | Form Factor | Power Supply Quantity (Std/Max) | Hot-Swap (Power, Slots, HDD, Fans) | Redundancy (Optional, Standard) | Adv System Management Processor | Onboard Ethernet (Mbps) | SCSI Controller (Dual, Ultra, RAID) | Removable Media Bays (Total/Avail) | Internal Hard Disk Drive (Std/Max) | CD-ROM (IDE) | Bays (Total/Avail) | Slots (Total/Avail) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **xSeries 200 At-A-Glance** | | | | | | | | | | | | | | | | |
| 8478-13X[6] | 667[1] | 1/1 | 128 | 128MB/1.5GB | Tower | 1/1 | - | - | - | 10/100 | U160 | 4/2 | 9.1/293.6GB[3] | 48X-20X | 7/4 | 5/4 |
| 8478-20X | 733[1] | 1/1 | 128 | 128MB/1.5GB | Tower | 1/1 | - | - | - | 10/100 | U160 | 4/2 | 0/293.6GB | 48X-20X | 7/5 | 5/4 |
| 8478-21X | 733[1] | 1/1 | 128 | 64MB/1.5GB | Tower | 1/1 | - | - | - | 10/100 | IDE | 4/2 | 20.4/293.6GB[3, 4] | 48X-20X | 7/4 | 5/5 |
| 8478-22X[5] | 733[1] | 1/1 | 128 | 64MB/1.5GB | Tower | 1/1 | - | - | - | 10/100 | IDE | 4/1 | 20.4/293.6GB[3, 4] | 48X-20X | 7/3[5] | 5/5 |
| 8478-23X[6] | 733[1] | 1/1 | 128 | 128MB/1.5GB | Tower | 1/1 | - | - | - | 10/100 | U160 | 4/2 | 18.2/293.6GB[3] | 48X-20X | 7/4 | 5/4 |
| 8478-30X | 800[2] | 1/1 | 128 | 128MB/1.5GB | Tower | 1/1 | - | - | - | 10/100 | U160 | 4/2 | 0/293.6GB | 48X-20X | 7/5 | 5/4 |
| 8478-31X | 800[2] | 1/1 | 128 | 64MB/1.5GB | Tower | 1/1 | - | - | - | 10/100 | IDE | 4/2 | 20.4/293.6GB[3, 4] | 48X-20X | 7/4 | 5/5 |
| 8478-33X[6] | 800[2] | 1/1 | 128 | 128MB/1.5GB | Tower | 1/1 | - | - | - | 10/100 | U160 | 4/2 | 18.2/293.6GB[3] | 48X-20X | 7/4 | 5/4 |
| 8478-42X[6] | 800[7] | 1/1 | 256 | 128MB/1.5GB | Tower | 1/1 | - | - | - | 10/100 | U160 | 4/2 | 9.1/293.6GB[3] | 48X-20X | 7/4 | 5/4 |
| 8478-60X | 933[7] | 1/1 | 256 | 128MB/1.5GB | Tower | 1/1 | - | - | - | 10/100 | U160 | 4/2 | 0/293.6GB | 48X-20X | 7/5 | 5/4 |
| 8478-61X | 933[7] | 1/1 | 256 | 64MB/1.5GB | Tower | 1/1 | - | - | - | 10/100 | IDE | 4/2 | 20.4/293.6GB[3, 4] | 48X-20X | 7/4 | 5/5 |
| 8478-62X[6] | 933[7] | 1/1 | 256 | 128MB/1.5GB | Tower | 1/1 | - | - | - | 10/100 | U160 | 4/2 | 18.2/293.6GB[3] | 48X-20X | 7/4 | 5/4 |
| 8478-70X | 1GHz[7] | 1/1 | 256 | 128MB/1.5GB | Tower | 1/1 | - | - | - | 10/100 | U160 | 4/2 | 0/293.6GB | 48X-20X | 7/5 | 5/4 |
| 8478-71X | 1GHz[7] | 1/1 | 256 | 64MB/1.5GB | Tower | 1/1 | - | - | - | 10/100 | IDE | 4/2 | 20.4/293.6GB[3, 4] | 48X-20X | 7/4 | 5/5 |
| 8478-72X[6] | 1GHz[7] | 1/1 | 256 | 128MB/1.5GB | Tower | 1/1 | - | - | - | 10/100 | U160 | 4/2 | 18.2/293.6GB[3] | 48X-20X | 7/4 | 5/4 |

1. Intel® Celeron™ processor with 66MHz FSB.
2. Intel Celeron processor with 100MHz FSB.
3. Maximum capacity assumes replacement of standard hard disk drives and tape drives with the largest supported IBM hard disk drive.
4. Maximum capacity may be increased by converting IDE models to support SCSI devices and replacing IDE devices with the largest supported IBM hard disk drives.
5. This model is configured with an IBM 10/20GB TR5 Internal IDE Tape Drive (P/N 20L0549).
6. Not available in the United States.
7. Intel Pentium III processor with advanced transfer L2 cache and 133MHz FSB.

## xSeries 200 Processors

| Part Number | Processor Upgrades | Processor Speed Upgrade[1] |
|---|---|---|
| 21P9539 | 800MHz Upgrade with 133MHz FSB and 256KB Advanced Transfer Cache Pentium III Processor | 1xX, 2xX |
| 10K3818 | 866MHz Upgrade with 133MHz FSB and 256KB Advanced Transfer Cache Pentium III Processor | 1 … 4xX |
| 10K3819 | Netfinity 933MHz with 133MHz FSB and 256KB Advanced Transfer Cache Pentium III Upgrade Processor | 1 … 4xX |
| 10K0051 | xSeries 1GHz Upgrade with 133MHz FSB 256KB Advanced Transfer Cache Pentium III Processor | 1 … 6xX |

1.Requires removal of the standard processor. A maximum of one processor may be installed. Upgrades may require a BIOS update. To obtain the latest Flash BIOS, access www.pc.ibm.com/support and enter machine "Type-Model" in Quick Path. Select "Downloadable files" then "BIOS."

## xSeries 200 Memory

| DIMM Socket |
|---|
| DIMM Socket |
| DIMM Socket |

| Part Number | Memory Description |
|---|---|
| 33L3079 | 64MB 133MHz ECC SDRAM DIMM Memory |
| 33L3081 | 128MB 133MHz ECC SDRAM DIMM Memory |
| 33L3083 | 256MB 133MHz ECC SDRAM DIMM Memory |
| 33L3085 | 512MB 133MHz ECC SDRAM Unbuffered DIMM Memory |

| Total System Memory (Standard Models)[1] | | DIMMs | | | |
|---|---|---|---|---|---|
| 64MB (1 x 64) | 128MB (1 x 128) | 64MB (33L3079) | 128MB (33L3081) | 256MB (33L3083) | 512MB (33L3085) |
| 128MB | 192MB | 1 | | | |
| 192MB | 256MB | 2 or | 1 | | |
| 320MB | 384MB | - | 2 or | 1 | |
| 384MB[2] | - | | 3 | | |
| 576MB | 640MB | | | 2 or | 1 |
| 768MB[2] | 768MB[2] | | | 3 | |
| 1088MB | 1152MB | | | | 2 |
| 1536MB (max)[2] | 1536MB[2] | | | | 3 |

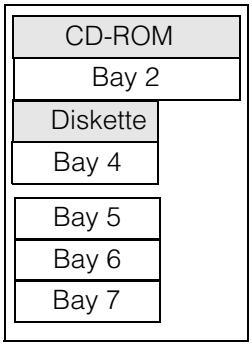
This table does not represent all possible memory configurations. Memory modules may vary in price per MB. Selection of smaller DIMMs may provide a more cost-effective alternative to using larger DIMMs. Select the desired total memory from the appropriate column (standard 64MB or 128MB), then select a quantity in that row from one of the DIMM columns.

1. Network operating systems may limit the maximum amount of addressable memory. See operating system specifications for further information.
2. Requires removal of standard DIMMs.

## xSeries 200 Hard Disk Drive (HDD)

| Total Internal Storage[1] | 7200RPM SCSI HDDs | | | 10,000RPM SCSI HDDs | | | | 15,000RPM SCSI HDDs |
|---|---|---|---|---|---|---|---|---|
| | 9.1GB 00N8204 | 18.2GB 00N8205 | 36.4GB 00N8206 | 9.1GB 00N8207 | 18.2GB 00N8208 | 36.4GB 00N8209 | 73.4GB 06P5752 | 18.2GB 19K0658 |
| 0GB | Standard on some base models | | | | | | | |
| 9.1GB | (Std on some models) | - | - | 1 | - | - | - | - |
| 18.2GB | 2 | 1 | - | 2 | 1 | - | - | 1 |
| 27.3GB | 3 | - | - | 3 | - | - | - | - |
| 36.4GB | 4 | 2 | 1 | 4 | 2 | 1 | - | 2 |
| 54.6GB | - | 3 | - | - | 3 | - | - | 3 |
| 72.8GB | - | 4 | 2 | - | 4 | 2 | - | 4 |
| 109.2GB | - | - | 3 | - | - | 3 | - | - |
| 145.6GB | - | - | 4 | - | - | 4 | - | - |
| 146.8GB | - | - | - | - | - | - | 2 | - |
| 220.2GB | - | - | - | - | - | - | 3 | - |
| 293.6GB (Max) | - | - | - | - | - | - | 4 | - |

This table does not represent all possible hard disk drive (HDD) configurations.
1. Select a total storage row and select the quantity of HDDs from a column corresponding to the hard disk drive of choice. Total Internal Storage listed is within +/- 0.2GB unless otherwise noted.




| Total Internal Storage[1] | 7200RPM IDE HDDs[2] | | |
|---|---|---|---|
| | 15GB (P/N 19K4460) | 20.4GB (P/N 19K4461) | 30GB (P/N 00N8203) |
| 15GB | (Std on EIDE models) | - | - |
| 30GB | 1 | - | - |
| 35.4GB | - | 1 | - |
| 45GB | - | - | 1 |
| 45GB[3] | 2 | - | - |
| 50.4GB[3] | 1 | 1 | - |
| 55.8GB[3] | - | 2 | - |
| 60GB[3] | 1 | - | 1 |
| 61.2GB[3] | - | 3[4] | - |
| 65.4GB[3] | - | 1 | 1 |
| 75GB[3] | - | - | 2 |
| 90GB (max) | - | -- | 3[4] |

This table does not represent all possible HDD configurations.Total Internal Storage listed is within +/-0.2GB unless otherwise noted.

1. Select a total storage row then add the quantity of HDDs from all columns to the standard HDD. Example: Total storage = 50.4GB, order 1 x 19K4460 and 1 x 19K4461.
2. The xSeries 200 EIDE controllers support a maximum of four IDE devices per machine including cd-rom drives, HDDs and IDE tape drives.
3. Not a supported configuration on model12X which includes an IBM 10/20GB TR5 Internal IDE Tape Drive (P/N 20L0549).
4. Requires removal of the standard HDD.

| Bay | Form Factor | Height | Front Access | Usage |
|---|---|---|---|---|
| 1 | 133mm (5.25in) | HH | yes | IDE CD-ROM |
| 2 | 133mm (5.25in) | HH | yes | open[1, 2] |
| 3 | 89mm (3.5in) | SL | yes | Diskette |
| 4 | 89mm (3.5in) | SL | yes | open |
| 5 … 7 | 89mm (3.5in) | SL | yes | open |

1. Supports removable media devices only. Hard disk drives are not supported.
2. Tape drive in model 8478-12X.

| Part Number | Description | RPM | Height | Bays Supported | Max Qty |
|---|---|---|---|---|---|
| **IDE HDDs[1, 2]** | | | | | |
| 19K4460 | 15GB 7200rpm ATA-100 (EIDE) HDD | 7200 | SL | 4 … 7 | 3[3] |
| 19K4461 | 20.4GB 7200rpm ATA-100 (EIDE) HDD | 7200 | SL | 4 … 7 | 3[3] |
| 00N8203 | 30GB 7200rpm ATA-100 (EIDE) HDD | 7200 | SL | 4 … 7 | 3[3] |
| **Ultra160 HDDs[2]** | | | | | |
| 00N8204 | 9.1GB 7200rpm Ultra160 SCSI HDD | 7200 | SL | 4 … 7 | 4 |
| 00N8205 | 18.2GB 7200rpm Ultra160 SCSI HDD | 7200 | SL | 4 … 7 | 4 |
| 00N8206 | 36.4GB 7200rpm Ultra160 SCSI HDD | 7200 | SL | 4 … 7 | 4 |
| 00N8207 | 9.1GB 10,000rpm Ultra160 SCSI HDD | 10000 | SL | 4 … 7 | 4 |
| 00N8208 | 18.2GB 10,000rpm Ultra160 SCSI HDD | 10000 | SL | 4 … 7 | 4 |
| 00N8209 | 36.4GB 10,000rpm Ultra160 SCSI HDD | 10000 | SL | 4 … 7 | 4 |
| 19K0658 | 18.2GB 15,000rpm Ultra160 SCSI HDD | 15000 | SL | 4 … 7 | 4 |
| 06P5752 | 73.4GB 10Krpm Ultra160 SCSI SL HDD | 10000 | SL | 4 … 7 | 4 |

| External Storage Expansion Units[4] | | Form Factor |
|---|---|---|
| 35311RU | EXP300 Storage Expansion Unit[5] | Rack (3U) |
| 09N7296 | EXP300 Rack-to-Tower Conversion Kit | - |

1.The xSeries 200 EIDE controllers support a maximum of four IDE devices per machine including CD-ROM drives, HDDs and IDE tape drives.
2. Mixing of IDE and SCSI HDDs is not supported.
3. Limited to two drives in model -12X due to installed tape drive option.
4. Not supported by the external SCSI port included in SCSI models. Select an optional SCSI controller then refer to Appendix D: Cables - Storage Unit - Controllers to confirm the controller supports the desired External Storage Expansion Unit and to select a supported cable. For HDD or other expansion unit options, see the specific expansion unit section.
5. EXP300 includes a single 2M Ultra2 SCSI cable and dual hot-swap 500W redundant power supplies, each with its own power cord. To convert an EXP300 to a tower form factor, EXP300 Rack-to-Tower Conversion Kit (P/N 09N7296) is required.

## xSeries 200 Internal SCSI Cabling

**EIDE Models**
In xSeries 200 models using the EIDE interface for storage device attachment, a two-drop cable is used to attach the standard15GB EIDE HDD to one of the EIDE connectors. A second EIDE controller provides the interface for the IDE CD-ROM drive. A two-drop cable connects the IDE controller to the IDE CD-ROM. Up to two additional IDE devices can be installed (one off of each controller).

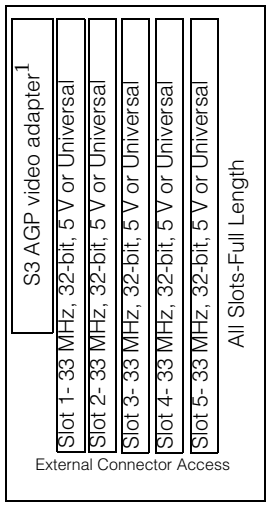
**SCSI Models**
xSeries 200 models with a SCSI adapter are cabled internally with a five-drop, 16-bit wide LVD SCSI cable with a built-in multi-mode active terminator at one end of the cable. The other end of the cable is attached to the internal 68-pin connector of the standard Ultra160 SCSI adapter. SCSI devices can be connected to any of the five cable connectors. If 8-bit (narrow) devices are to be installed, a 68- to 50-pin converter (32G3925) is required for each narrow device.

**Other Configuration Alternatives**
In the case where a RAID controller is used to support internal drives in a xSeries 200, the standard cable is moved from the onboard controller to the RAID adapter. To connect a tape drive to the onboard or other supported SCSI controller, use the 16-bit multi-mode terminated, two-drop SCSI cable included with optional Media Bay Tray and LVD Cable Kit (P/N 10K2340).

External SCSI support can be obtained by installing an optional SCSI adapter or RAID controller and using appropriate external SCSI cabling.

## xSeries 200 I/O Options

| Part Number | Description | Adapter Length | PCI Support[1] | Slots Supported[2, 3] |
|---|---|---|---|---|
| | **Storage Controllers[4, 5]** | | | |
| 37L6091 | ServeRAID-4L Ultra160 SCSI Controller[6] | Full | 64-bit | 2 … 5 |
| 37L6080 | ServeRAID-4M Ultra160 SCSI Controller[7] | Full | 64-bit | 2 … 5 |
| 06P5736 | ServeRAID-4Mx Ultra160 SCSI Controller[8] | Full | 64-bit | 2 … 5 |
| 06P5740 | ServeRAID-4Lx Ultra160 SCSI Controller[9] | Half | 64-bit | 2 … 5 |
| 19K4646 | PCI Wide Ultra160 SCSI Adapter[10] | Half | 32-bit | 2 … 5 |
| 02K3454 | PCI Fast/Wide Ultra SCSI Adapter[16] | Half | 32-bit | 2 … 5 |
| | **Networking[11]** | | | |
| | **Ethernet[12]** | | | |
| 09N9901 | 10/100 EtherLink Server Adapter by 3Com[13] | Half | 32-bit | 1 … 5 |
| 19K4401 | Netfinity Gigabit Ethernet Adapter (copper) | Half | 64-bit | 1 … 5 |
| 06P3601 | 10/100 Ethernet Server Adapter[13] | Half | 32-bit | 1 … 5 |
| 06P3701 | Gigabit Ethernet SX Server Adapter (fiber) | Half | 64-bit | 1 … 5 |
| | **Token Ring** | | | |
| 34L0701 | Token-Ring 16/4 PCI Adapter 2 with Wake on LAN[13] | Half | 32-bit | 1 … 5 |
| 34L5001 | 16/4 Token-Ring PCI Management Adapter[13] | Half | 32-bit | 1 … 5 |
| 34L5201 | High-Speed 100/16/4 Token-Ring PCI Management Adapter[13] | Half | 32-bit | 1 … 5 |
| | **Communications[14]** | | | |
| 33L4618 | V.90 PCI Data/Fax Modem | Half | 32-bit | 2 … 5 |
| 37L14xx | Serial I/O SST 8, 16 and 128 Port Adapters[15] | Half | 32-bit | 2 … 5 |


S3 AGP video adapter[1]
Slot 1- 33 MHz, 32-bit, 5 V or Universal
Slot 2- 33 MHz, 32-bit, 5 V or Universal
Slot 3- 33 MHz, 32-bit, 5 V or Universal
Slot 4- 33 MHz, 32-bit, 5 V or Universal
Slot 5- 33 MHz, 32-bit, 5 V or Universal
All Slots-Full Length
External Connector Access

1. xSeries 200 ships standard with the S3 AGP video adapter. Alternate video adapters are not supported.

1. A 64-bit adapter installed into a 32-bit slot will transfer data at 32-bit rates. Adapters rated at 66MHz will operate at 33MHz when installed in a 33MHz slot.
2. The xSeries 200 has five full-length, 33MHz PCI expansion slots. The number of available slots is model specific.
3. The Ultra160 SCSI controller shipped standard in SCSI models is installed in slot three.
4. Some models of the xSeries 200 include a single channel Ultra160 SCSI Adapter with a five-drop multi-mode terminated LVD SCSI Cable. All other models include dual-channel EIDE controllers and require an optional SCSI adapter for SCSI functionality. See At-A-Glance for model attributes
5. Storage controllers are supported in slots two through five only. Slots two and four and slots three and five are paired so that they support only the same type of adapter, e.g., if a storage controller is installed in slot two, installing only another storage controller in slot four is recommended. Thus, a networking adapter should not be installed in slot four when a storage controller is installed in slot two. (Slot one is next to the AGP video adapter, and slot five is the farthest from the processors.)
6. ServeRAID-4L Ultra160 SCSI Controller is powered by a 100MHz Intel i960 processor and provides a single channel, 16MB of ECC cache and either one internal or one external Ultra160 connection. External connector is 0.8mm VHDCI.
7. ServeRAID-4M Ultra160 SCSI Controller is powered by a 100MHz Intel i960 processor and provides two channels, 64MB of battery-backed ECC cache and two external 0.8mm VHDCI Ultra160 connectors.
8. ServeRAID-4Mx Ultra160 SCSI Controller is powered by a 100MHz Intel Zion GC80303 processor that provides 64MB of battery-backed ECC cache and two internal and two external Ultra160 connections (only two connectors may be used). External connections are 0.8mm VHDCI.
9. ServeRAID-4Lx Ultra160 SCSI Controller is powered by a 100MHz Intel Zion GC80303 processor and provides a single channel, 32MB of ECC cache and either one internal or one external Ultra160 connection. External connectior is 0.8mm VHDCI.
10. PCI Wide Ultra160 SCSI Adapter (P/N 19K4646) provides a single channel with one internal connector, a five-drop multi-mode terminated LVD SCSI cable and one external 0.8mm VHDCI connector. Only one of the two connectors may be utilized.
11. xSeries 200 includes an integrated full-duplex, 10/100Mbps Ethernet controller. Networking adapters are supported in slots one through five. Slots two and four and slots three and five are paired so that they support only the same type of adapter, e.g., if a networking adapter is installed in slot three, only another networking adapter should be installed in slot five. Thus, a storage controller should not be installed in slot five when a networking adapter is installed in slot three.
12. In a fault-tolerant networking environment, using the fault-tolerant software delivered with the Ethernet adapters of a single manufacturer is recommended. Installing fault-tolerant solutions provided by multiple manufacturers may cause failures if the intermediate drivers provided with the adapters are not compatible. The onboard Ethernet is Intel-based, which is compatible with the two Intel-based optional Ethernet adapters (P/N 06P3601, 06P3701).
13. Wake on LAN™ is supported for this option when installed in slots one through five (refer to limitation explained in the footnotes associated with the Storage Controllers and Networking headings in the table).
14. xSeries 200 includes two USB ports, two high-speed serial/asynchronous ports (NS16550A software compatible) and one high-speed parallel port supporting devices using SSP/EPP/ECP protocols adhering to the IEEE 1284 Standard.7.
15. See Appendix E for details on Serial I/O options and configuration limitations.
16. PCI Fast/Wide Ultra SCSI Adapter (P/N 02K3454) provides one external 68-pin high density connector that supports external SCSI devices such as tape enclosures.

## xSeries 200 Power, Monitors & Accessories

| Part Number | Description |
|---|---|
| | **Power[1]** |
| | **Free Standing Uninterruptible Power Supply (UPS)[2]** |
| 94G3134 | APC Smart-UPS 700 |
| 94G3135 | APC Smart-UPS 1000 |
| 94G3136 | APC Smart-UPS 1400 |
| | **Rack Mount Uninterruptible Power Supply (UPS)[2]** |
| 94G6674 | APC Smart-UPS 1400RMB[3] |
| 94G6676 | APC Smart-UPS 3000RMB[3] |
| 37L6861 | APC Smart-UPS 5000RMB[4] |
| | **Monitors[5]** |
| 633347N | E51 Color Monitor 15in (350mm, 13.8in Viewable Image Size), stealth black[6] |
| 6331N2N | E54 Color Monitor 15in (350mm, 13.8in Viewable Image Size), stealth black[6] |
| 6332J1N | E74 Color Monitor 17in (403mm, 15.9in Viewable Image Size), stealth black[6] |
| 66274AN | G78 Color Monitor 17in (406.4mm, 16in Viewable Image Size), stealth black[6] |
| 9511AG4 | T540 Flat Panel Color Monitor 15in (381mm, 15in viewable image), stealth black[7] |

1. The xSeries 200 includes a 330W voltage sensing power supply and a single line cord..
2. For runtimes and UPS attributes see Appendix C: UPS Runtime Estimate.
3. Height is 3U. See Rack Cabinets and Options section for supported IBM racks.
4. Height is 5U. See Rack Cabinets and Options section for supported IBM racks.
5. The xSeries 200 contains a S-3 Savage-4 LT video adapter with 8MB of video memory plugged into the standard AGP slot.
6. Installation within a rack requires optional Monitor Compartment (P/N 94G7444).
7. Installation within a rack requires optional Netfinity Flat Panel Monitor Rack Mount Kit II (P/N 37L6888) and Netfinity Rack Keyboard Tray (P/N 28L4707). A space saver keyboard may coexist within the same 28L4707 keyboard tray.

| Part Number | Description |
|---|---|
| | **Conversion Kits** |
| 09N4300 | 4Ux20D Tower-to-Rack Kit |
| | **Rack and NetBAY[1]** |
| | Refer to the Rack Cabinets and Options section for information concerning IBM racks and rack-supported devices. |
| | **Keyboard and Mouse[2]** |
| 28L3644 | Space Saver II Keyboard[3, 4] |
| 01K1260 | TrackPoint IV 104-key Black Keyboard[4, 5] |
| 28L3621 | Preferred Keyboard (stealth black)[5] |
| 28L3673 | Sleek 2-button Stealth Black Mouse |

1 Rack installation of an xSeries 200 requires 4Ux20D Tower-to-Rack Kit (P/N 09N4300) and one of the racks listed in the Rack Cabinets and Options section.
2. The xSeries 200 includes both a mouse and nonspace saver keyboard.
3. Installation within a rack requires optional keyboard tray (P/N 28L4707) which stows in “ready-to-use” position.
4. Advanced TrackPoint IV features are not available on IBM xSeries or Netfinity systems.
5. Installation within a rack requires optional keyboard tray (P/N 28L4707). This keyboard cannot share a keyboard tray with a flat panel display.

## xSeries 200 Tape Options

| Part Number | Tape Drives | Bays Supported | SCSI Interface (bit) | Form Factor | Termination Included | 68/50-pin Converter Incl | Ext Tape Enclosures[1] |
|---|---|---|---|---|---|---|---|
| 20L0549 | 10/20GB TR5 Internal IDE Tape Drive[2] | 2, 4 | - | 89mm (3.5in) SL or 133mm (5.25in) HH | - | - | - |
| 09N4040 | 20/40GB DLT Internal SCSI Tape Drive | - | 8 | 133mm (5.25in) FH | N | Y | 3551001 |
| 09N4041 | 12/24GB DDS/3 4mm Internal SCSI Tape Drive[3, 4] | 2 | 8 | 89mm (3.5in) HH or 133mm (5.25in) HH | Y | Y | 3510020, 3551001 |
| 09N4042 | 10/20GB NS Internal SCSI Tape Drive[3, 4] | 2, 4 | 8 | 89mm (3.5in) SL or 133mm (5.25in) HH | Y | Y | 3510020, 3551001 |
| 00N7991 | 20/40 GB DDS/4 4mm Internal Tape Drive[4, 5] | 2 | 16 Ultra2 LVD | 89mm (3.5in) HH or 133mm (5.25in) HH | N | - | 3510020[6], 3551001[7] |
| 00N8016 | 100/200GB LTO Tape Drive | - | 16 Ultra2 LVD | 133mm (5.25in) FH | N | - | 3551001[7] |
| 24P2398 | 40/80GB Half-High DLTVS Internal SCSI Tape Drive[4, 5] | 2, 4 | 16 Ultra2 LVD | 133mm (5.25in) HH | N | - | 3551001[7] |
| | **External Tape Libraries[8]** | | | | | | |
| 3570C2x | Magstar MP 3570 Tape Subsystem | - | HVD | 6U Rack | Y | - | - |
| 3600220 | 3600 Series 2/4TB LTO Tape Library (Tower) | - | 16 Ultra2 LVD | Tower | Y | - | - |
| | **External Tape Enclosures** | | | | | | |
| 3510020 | External Half High SCSI Storage Enclosure[9] | - | 8, 16 | Desktop | N | N | - |
| 3551001 | NetMEDIA Storage Expansion Unit EL[10] | - | 16 | Rack | Y | N | - |
| 10L7113 | NetMEDIA Systems Management Adapter[11] | - | 16 LVD | - | N | N | 3551001 |
| | **Associated Options** | | | | | | |
| 00N7956 | 68-pin External Multimode LVD/SE SCSI Terminator | - | 16 LVD/SE | External | Y | N | 3510020 |
| 10K2340 | Media Bay Tray and LVD Cable Kit[4, 7] | - | 16 LVD | Internal | Y | N | 3551001 |

Note: SCSI models include an Ultra160 SCSI controller with a five-drop multi-mode terminated LVD SCSI cable. Single-ended devices attached to this cable will limit the entire SCSI bus to single-ended performance. SCSI tape drives and external tape enclosures are supported by PCI Wide Ultra160 SCSI Adapter (P/N 19K4646) which includes a five-drop multi-mode LVD SCSI cable and an external 0.8-mm VHDCI connector.

1. To determine cable requirements, note the tape drive's SCSI interface, the appropriate SCSI controller from the system configurator section, and the desired enclosure, then refer to Appendix D: Cables - Storage Units - Controllers.
2. SCSI models include a two-drop EIDE cable for attachment to the CD-ROM and an IDE tape drive. Model 8478-12X and 22X include 10/20GB TR5 Internal IDE Tape Drive (P/N 20L0549).
3.This single-ended device will limit the SCSI bus to which it is attached to Ultra SCSI speeds. To provide a dedicated tape SCSI bus, install PCI Wide Ultra160 SCSI Adapter (P/N 19K4646) which includes a five-drop multi-mode LVD SCSI cable.
4. RAID configurations (SCSI models only) where the standard SCSI cable is attached to a RAID adapter require the two-drop multi-mode terminated LVD SCSI cable included with Media Bay Tray and LVD Cable Kit (P/N 10K2340).
5. EIDE models require optional PCI Wide Ultra160 SCSI Adapter (P/N 19K4646) which includes a five-drop multi-mode LVD SCSI cable.
6. Requires 68-pin External Multimode LVD/SE SCSI Terminator (P/N 00N7956)
7. LVD support for LVD devices installed in a NetMEDIA Storage Expansion Unit EL (P/N 3551001) requires replacement of the standard single-ended internal cables with one or more (depending on configuration) cables from Media Bay Tray and LVD Cable Kit (P/N 10K2340), which contains a single two-drop multi-mode terminated LVD cable. If the standard cables are used for attachment to LVD devices, single-ended SCSI rules and bus speeds apply.
8. Tape library attributes and prerequisites are located in Appendix B: Tape Library Attributes.
9. Provides a black desktop 133mm (5.25in) half-high (HH) tape enclosure. Connector is configurable as 50-pin Centronix or 68-pin high density. Requires either tape drive self termination or 68-pin External Multimode LVD/SE SCSI Terminator (P/N 00N7956).
10. NetMEDIA Storage Expansion Unit EL (P/N 3551001) is a black 3U, 19in rack mountable tape enclosure which includes two full high (FH) or four half high (HH) extended length 133mm (5.25in) bays, two external 68-pin high density connectors and two internal four-drop single-ended terminated 16-bit SCSI cables for device attachment. Two power supplies and two power cords are also included. Tip: The front rail clips will need to be reversed and screwed in from behind to secure the unit in a 930842x rack.
11. NetMEDIA Systems Management Adapter (P/N 10L7113) may be installed in a 3551001 to provide repeater function, LVDS interface, aggregate cable lengths up to 12 meters when attached to an LVD SCSI controller, and auto-termination when the 3551001 is powered off. External connector is 0.8mm VHDCI.

Note: Additional tape attributes can be found in Appendix A: Tape Drive Attributes.

## xSeries 200 Sample Configurations

Note: The following sample configurations are for illustration only and may not be suitable for any specific customer installation. Contact your IBM Business Partner or IBM Marketing Representative for assistance with your specific configuration requirements.

### Internet Server

| Part Number | Description | Quantity |
|---|---|---|
| 8478-22X | xSeries 200 733MHz/128KB Celeron, 64MB ECC, 20.4GB IDE, Tape, 48X | 1 |
| 33L3081 | 128MB 133Mhz ECC SDRAM DIMM Memory | 1[1] |
| 19K4461 | 20.4GB 7200rpm ATA/100 (EIDE) HDD | 1[2] |
| 6331N2N | E54 Color Monitor 15in (350mm, 13.8in Viewable Image Size), stealth black | 1 |
| 94G3134 | APC Smart-UPS 700 | 1 |

1. For a total of 192MB of system memory.
2. For a total of 40.8GB of internal storage.

An Internet server handles all requests from the Internet (Intranet or Extranet). Usually, this type of server has the same characteristics as a normal file server. The main difference is that an Internet server talks a different language (TCP/IP vs NETBEUI or IPX/SPX) and often needs to do an extra security check (firewall). In the case of an Internet server, the server itself talks mostly to one client, the Internet Service Provider (ISP), instead of many clients as a file server does.

With this is mind, the xSeries 200 was selected to provide an affordable price point for the growing Internet server market with an Intel Celeron processor, 192MB of system memory (expandable to 1.5GB), and power protection with an APC Smart-UPS.

The network configuration depends on the method that will be used to connect the server to the Internet. Usually fast Ethernet routers are used, but if other methods are used you can add the appropriate adapter. The configuration includes a tape backup unit for secure backup of critical data in the event of a system or storage failure.

### File and Print Server

| Part Number | Description | Quantity |
|---|---|---|
| 8478-70X | x200 Pentium III 866/256, 128MB, Ultra160, Open, 48X | 1 |
| 33L3081 | xSeries 200 1GHz/256KB Pentium III, 128MB ECC, OPEN, 48X | 1[1] |
| 00N8208 | 18.2GB 10,000RPM Ultra160 SCSI HDD | 3[2] |
| 00N7991 | 20/40GB DDS/4 4mm Internal Tape Drive | 1 |
| 6331N2N | E54 Color Monitor 15in (350mm, 13.8in Viewable Image Size), stealth black | 1 |
| 94G3134 | APC Smart-UPS 700 | 1 |

1. For a total of 256MB of system memory.
2. For a total of 54.6GB of internal storage.

A small business or departmental server is usually required to perform all typical server functions while servicing up to 100 users in a normal workgroup computing environment, but doesn't require the high-end performance and fault-tolerance properties of larger servers.

The sample configuration above consists of an xSeries 200 with 256MB of memory and 54.6GB of hard disk drive space. It has enough processor power and memory to run most current network operating systems comfortably and enough hard disk drive space to store a significant amount of data with additional external storage expansion still available. Demanding network traffic is effectively handled by the standard 100Mbps Ethernet connection.

This configuration also includes a tape backup unit, monitor, and a UPS to keep the system protected during power surges and outages.

### Application Server

| Part Number | Description | Quantity |
|---|---|---|
| 8478-70X | xSeries 200 1GHz/256KB Pentium III, 128MB ECC, OPEN, 48X | 1 |
| 33L3083 | 256MB 133MHz ECC SDRAM DIMM Memory | 1[1] |
| 37L6091 | ServeRAID-4L Ultra160 SCSI Controller | 1 |
| 00N8207 | 9.1GB 10,000rpm Ultra160 SCSI HDD | 3[2] |
| 10K2340 | Media Bay Tray and LVD Cable Kit[3] | 1 |
| 09N4042 | 10/20GB NS Internal SCSI Tape Drive | 1 |
| 6331N2N | E54 Color Monitor 15in (350mm, 13.8in Viewable Image Size), stealth black | 1 |
| 94G3134 | APC Smart-UPS 700 | 1 |

1. For a total of 384MB of system memory.
2. Three HDDs are used for RAID 5 protection. Effective capacity is two HDDs or 18.2GB.
3. Cable for dedicated attachment of tape to standard controller.

An application server differs from a file and print server in that it has a higher workload in providing application serving requirements for users. With this in mind, the xSeries 200 was selected to provide an affordable price point for an application server with Pentium III processing, 384MB of system memory (expandable to 1.5GB), and availability features such as RAID-protected internal storage and power protection with an APC Smart-UPS.

# IBM xSeries 220

| Part Number | Processor Speed (MHz)[1] | Number of Processors (Std/Max) | L2 ECC Cache (KB) | Memory (Std/Max) (R=RDIMM) | Form Factor | Power Supply Quantity (Std/Max) | Hot-Swap (Power, Slots, HDD, Fans) | Redundancy (Optional, Standard) | Adv System Management Processor | Onboard Ethernet (Mbps) | SCSI Controller (Dual, Ultra, RAID) | Removable Media Bays (Total/Avail) | Internal Hard Disk Drive (Std/Max) | CD-ROM (IDE)[2] | Bays (Total/Avail) | Slots (Total/Avail) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **xSeries 220 At-A-Glance** | | | | | | | | | | | | | | | | |
| 8645-41X | 933 | 1/2 | 256 | 128MB(R)/4GB | Tower | 1/1 | - | - | - | 10/100 | U160 | 4/2 | 0/293.6GB | 48X-20X | 7/5 | 5/5 |
| 8645-42X | 933 | 1/2 | 256 | 128MB(R)/4GB | Tower | 1/1 | - | - | - | 10/100 | U160 | 4/2 | 18.2/293.6GB | 48X-20X | 7/4 | 5/5 |
| 8645-4AX | 933 | 1/2 | 256 | 128MB(R)/4GB | Tower | 1/1 | H | - | - | 10/100 | U160 | 4/2 | 0/293.6GB | 48X-20X | 7/5 | 5/5 |
| 8645-51X | 1GHz | 1/2 | 256 | 128MB(R)/4GB | Tower | 1/1 | - | - | - | 10/100 | U160 | 4/2 | 0/293.6GB | 48X-20X | 7/5 | 5/5 |
| 8645-52X | 1GHz | 1/2 | 256 | 128MB(R)/4GB | Tower | 1/1 | - | - | - | 10/100 | U160 | 4/2 | 18.2/293.6GB | 48X-20X | 7/4 | 5/5 |
| 8645-5AX | 1GHz | 1/2 | 256 | 128MB(R)/4GB | Tower | 1/1 | H | - | - | 10/100 | U160 | 4/2 | 0/293.6GB | 48X-20X | 7/5 | 5/5 |

1. Intel Pentium III processor with advanced transfer L2 cache and 133MHz FSB.
2. Variable read rate. Actual playback speed will vary and is often less than the maximum possible.

## xSeries 220 Processor Upgrades

| Part Number | Processor Upgrades | SMP Support[1] | Processor Speed Upgrade[2] |
|---|---|---|---|
| 10K3819 | Netfinity 933MHz with 133MHz FSB and 256KB Advanced Transfer Cache Pentium III Upgrade Processor | 4xX | - |
| 10K0051 | xSeries 1GHz Upgrade with 133MHz FSB 256KB Advanced Transfer Cache Pentium III Processor | 5xX | 4xX |

1. One additional processor may be installed, providing a maximum of two. All processors must be identical in type, speed, and cache size.
2. Requires removal of the standard processor. A maximum of one processor may be installed. Upgrades may require a BIOS update. To obtain the latest Flash BIOS, access www.pc.ibm.com/support and enter machine "Type-Model" in Quick Path. Select "Downloadable files" and then "BIOS".

## xSeries 220 Memory

| |
|---|
| RDIMM Socket |
| RDIMM Socket |
| RDIMM Socket |
| RDIMM Socket |

| Part Number | Memory Description[1] |
|---|---|
| 33L3142 | 128MB 133MHz SDRAM ECC RDIMM Memory |
| 33L3144 | 256MB 133MHz SDRAM ECC RDIMM Memory |
| 33L3146 | 512MB 133MHz SDRAM ECC RDIMM Memory |
| 33L3152 | 1GB 133MHz SDRAM ECC RDIMM |

1. Install additional DIMMs in sequence of socket two through four.

| Total System Memory[1] | Quantity of RDIMMs Added | | | |
|---|---|---|---|---|
| | 128MB (1 x 128) | 128MB (33L3142) | 256MB (33L3144) | 512MB (33L3146) | 1GB (33L3152) |
| 256MB | 1 | - | - | - |
| 384MB | 2 or | 1 | - | - |
| 512MB | 3 | - | - | - |
| 640MB | - | 2 or | 1 | - |
| 896MB | - | 3 | - | - |
| 1024MB[2] | - | 4 | - | - |
| 1152MB | - | | 2 or | 1 |
| 1664MB | - | | 3 | - |
| 2048MB[2] | - | | 4 | - |
| 2176MB | - | | - | 2 |
| 3200MB | - | | - | 3 |
| 4096MB[2] (max) | - | | - | 4 |

This table does not represent all possible memory configurations. Memory modules may vary in price per MB. Selection of smaller RDIMMs may provide a more cost-effective alternative to using larger RDIMMs. Select the desired total memory from the appropriate column (Standard Model128MB), then select a quantity in that row from one of the RDIMM columns.

1. Network operating systems may limit the maximum amount of addressable memory. See operating system specifications for further information.
2. Requires removal of standard memory.

## xSeries 220 Hard Disk Drive (HDD) and External Storage

| Total Internal Storage[1] | 7200RPM HDDs | | | 10,000RPM HDDs | | | | 15,000RPM HDDs | |
|---|---|---|---|---|---|---|---|---|---|
| | 9.1GB (00N8204 or 37L7201)[2] | 18.2GB (00N8205 or 37L7202)[2] | 36.4GB (00N8206 or 37L7203)[2] | 9.1GB (00N8207 or 37L7204)[2] | 18.2GB (00N8208 or 37L7205)[2] | 36.4GB (00N8209 or 37L7206)[2] | 73.4GB (06P5752 or 06P5756)[2] | 9.1GB 19K0655[4] | 18.2GB 19K0658 or 19K0656[2] |
| 0GB | Standard on base models[5] | | | | | | | | |
| 9.1GB | 1 | - | - | 1 | - | - | - | 1 | - |
| 18.2GB | 2 | 1 | - | 2 | 1 | - | - | 2 | 1 |
| 27.3GB | 3 | - | - | 3 | - | - | - | 3 | - |
| 36.4GB | 4[3] | 2 | 1 | 4[3] | 2 | 1 | - | - | 2 |
| 45.5GB | - | - | - | - | - | - | - | - | - |
| 54.6GB | - | 3 | - | - | 3 | - | - | - | 3 |
| 72.8GB | - | 4[3] | 2 | - | 4[3] | 2 | - | - | 4[3] |
| 91GB | - | - | - | - | - | - | | - | - |
| 109.2GB | - | - | 3 | - | - | 3 | | - | - |
| 145.6GB | - | - | 4[3] | - | - | 4[3] | | - | - |
| 146.8GB | - | - | - | - | - | - | 2 | - | - |
| 220.2GB | - | - | - | - | - | - | 3 | - | - |
| 293.6GB (max) | - | - | - | - | - | - | 4[3] | - | - |

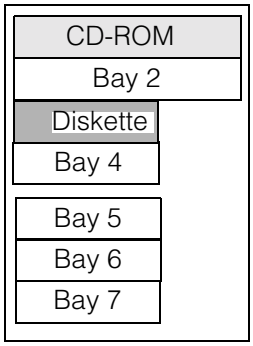
This table does not represent all possible HDD configurations.
1. Select a total storage row then select the quantity of HDDs from a column corresponding to the HDD of choice. Total Internal Storage listed is within +/- 0.2 GB unless otherwise noted.
2. Both hot-swap and nonhot-swap HDDs are listed. Select the appropriate part number for the model of xSeries 220 being configured.
3. A maximum of three hot-swap drives may be installed in hot-swap models. This configuration requires installation of a nonhot-swap HDD in Bay 4.
4. Hot-Swap models only.
5. Models 8645-42X and 52X ship standard with an 18.2GB Ultra160 SCSI HDD.

| Part Number | Description | RPM | Height | Hot-Swap Models | | Non-Hot-Swap Models | |
|---|---|---|---|---|---|---|---|
| | | | | Bays Supported | Maximum Quantity | Bays Supported | Maximum Quantity |
| | **Non-Hot-Swap Ultra160 Hard Disk Drives (HDD)[1]** | | | | | | |
| 00N8204 | 9.1GB 7200rpm Ultra160 SCSI HDD | 7200 | SL | 4 | 1 | 4 … 7 | 4 |
| 00N8205 | 18.2GB 7200rpm Ultra160 SCSI HDD | 7200 | SL | 4 | 1 | 4 … 7 | 4 |
| 00N8206 | 36.4GB 7200rpm Ultra160 SCSI HDD | 7200 | SL | 4 | 1 | 4 … 7 | 4 |
| 00N8207 | 9.1GB 10,000rpm Ultra160 SCSI HDD | 10000 | SL | 4 | 1 | 4 … 7 | 4 |
| 00N8208 | 18.2GB 10,000rpm Ultra160 SCSI HDD | 10000 | SL | 4 | 1 | 4 … 7 | 4 |
| 00N8209 | 36.4GB 10,000rpm Ultra160 SCSI HDD | 10000 | SL | 4 | 1 | 4 … 7 | 4 |
| 19K0658 | 18.2GB 15,000rpm Ulltra160 SCSI HDD | 15000 | SL | 4 | 1 | 4 … 7 | 4 |
| 06P5752 | 73.4GB 10Krpm Ultra160 SCSI SL HDD | 10000 | SL | 4 | 1 | 4 … 7 | 4 |
| | **Hot-Swap Ultra160 HDDs[2]** | | | | | | |
| 37L7201 | 9.1GB Ultra160 SCSI Hot-Swap SL HDD | 7200 | SL | 5 … 7 | 3 | - | - |
| 37L7202 | 18.2GB Ultra160 SCSI Hot-Swap SL HDD | 7200 | SL | 5 … 7 | 3 | - | - |
| 37L7203 | 36.4GB Ultra160 SCSI Hot-Swap SL HDD | 7200 | SL | 5 … 7 | 3 | - | - |
| 37L7204 | 9.1GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD | 10000 | SL | 5 … 7 | 3 | - | - |
| 37L7205 | 18.2GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD | 10000 | SL | 5 … 7 | 3 | - | - |
| 37L7206 | 36.4GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD | 10000 | SL | 5 … 7 | 3 | - | - |
| 19K0655 | 9.1GB 15K-rpm Ultra160 SCSI Hot-Swap HDD | 15000 | SL | 5 … 7 | 3 | - | - |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 19K0656 | 18.2GB 15K-rpm Ultra160 SCSI Hot-Swap HDD | 15000 | SL | 5 … 7 | 3 | - | - |
| 06P5756 | 73.4GB 10Krpm Ultra160 SCSI Hot-Swap SL HDD | 10000 | SL | 5 … 7 | 3 | - | - |

| External Storage Expansion Units[3] | | Form Factor |
|---|---|---|
| 35311RU | EXP300 Storage Expansion Unit[4] | Rack (3U) |
| 09N7296 | EXP300 Rack-to-Tower Conversion Kit | - |

1. Nonhot-swap HDDs are supported in bays 4 … 7 of nonhot swap models and in bay four of hot-swap models.
2. Hot-swap HDDs are supported in bays 5 … 7 of hot-swap models. Bay four supports nonhot-swap HDDs only.
3. Not supported by the onboard SCSI controller. Select an optional SCSI controller then refer to Appendix D: Cables - Storage Units - Controllers to confirm the controller supports the desired External Storage Expansion Unit and to select a supported cable. For HDD or other expansion unit options, see the specific expansion unit section.
4. EXP300 includes a single 2M Ultra2 SCSI cable and dual hot-swap 500W redundant power supplies, each with its own power cord. To convert an EXP300 to a tower form factor, EXP300 Rack-to-Tower Conversion Kit (P/N 09N7296) is required.




| Bay | Form Factor | Height | Front Access | Usage |
|---|---|---|---|---|
| 1 | 133mm (5.25in) | HH | yes | IDE CD-ROM |
| 2 | 133mm (5.25in) | HH | yes | open[1] |
| 3 | 89mm (3.5in) | SL | yes | Floppy |
| 4 | 89mm (3.5in) | SL | yes | open |
| 5 … 7 | 89mm (3.5in) | SL[2] | yes | open |

1. This bay does not support HDD options. It can be used for removable media devices such as tape drives.
2. These bays will be configured as hot-swap bays on models -2AX, -3AX, -4AX and -5AX.

## xSeries 220 Internal SCSI Cabling

### Non-Hot-Swap Models

xSeries 220 nonhot-swap models are cabled internally with a five-drop, 16-bit wide LVD SCSI cable with a built-in multi-mode active terminator on one end of the cable. The other end of the cable is attached to the internal 68-pin connector of the integrated Ultra160 SCSI controller. SCSI devices can be connected to any of the five cable connectors. If 8-bit (narrow) devices are to be installed, a 68- to 50-pin converter (32G3925) is required for each narrow device.

### Hot-Swap Models

xSeries 220 hot-swap models are cabled internally with a two-drop, 16-bit wide LVD SCSI cable. One end is connected to the internal 68-pin connector of the integrated Ultra160 SCSI controller. The first drop is designed to support a SCSI device in the 3.5-inch nonhot-swap bay, while the second drop is connected to the hot-swap SCSI backplane.The SCSI backplane provides termination for the SCSI bus.

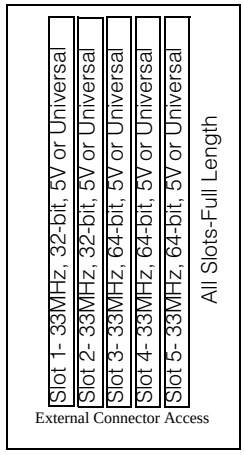
### Other Configuration Alternatives

In the case where a RAID controller is used to support internal drives in a xSeries 220, the standard cable is moved from the onboard controller to the RAID adapter. To connect a tape drive to the onboard or other supported SCSI controller, the two-drop cable from Media Bay Tray and LVD Cable Kit (P/N 10K2340) must be used.

External SCSI support can be obtained by installing an optional SCSI adapter or RAID controller and using appropriate external SCSI cabling.

## xSeries 220 I/O Options

| Part Number | Description | Adapter Length | PCI Support[1] | Slots Supported[2] |
|---|---|---|---|---|
| | **Storage Controllers[3]** | | | |
| 37L6091 | ServeRAID-4L Ultra160 SCSI Controller[4] | Full | 64-bit | 1, 2, 3, 5 |
| 37L6080 | ServeRAID-4M Ultra160 SCSI Controller[5] | Full | 64-bit | 1, 2, 3, 5 |
| 06P5736 | ServeRAID-4Mx Ultra160 SCSI Controller[6] | Full | 64-bit | 1, 2, 3, 5 |
| 06P5740 | ServeRAID-4Lx Ultra160 SCSI Controller[7] | Half | 64-bit | 1, 2, 3, 5 |
| 19K4646 | PCI Wide Ultra160 SCSI Adapter[8] | Half | 32-bit | 1 … 5 |
| 02K3454 | PCI Fast/Wide Ultra SCSI Adapter[9] | Half | 32-bit | 1 … 5 |
| | **Networking[10]** | | | |
| | **Ethernet[11]** | | | |
| 09N9901 | 10/100 EtherLink Server Adapter by 3Com[12] | Half | 32-bit | 1 … 5 |
| 19K4401 | Netfinity Gigabit Ethernet Adapter (copper) | Half | 64-bit | 1 … 5 |
| 06P3601 | 10/100 Ethernet Server Adapter[12] | Half | 32-bit | 1 … 5 |
| 06P3701 | Gigabit Ethernet SX Server Adapter (fiber) | Half | 64-bit | 1 … 5 |
| | **Token Ring** | | | |
| 34L0701 | Token-Ring 16/4 PCI Adapter 2 with Wake on LAN[12] | Half | 32-bit | 1 … 5 |
| 34L5001 | 16/4 Token-Ring PCI Management Adapter[12] | Half | 32-bit | 1 … 5 |
| 34L5201 | High-Speed 100/16/4 Token-Ring PCI Management Adapter[12] | Half | 32-bit | 1 … 5 |
| | **Communications[13]** | | | |
| 33L4618 | V.90 PCI Data/Fax Modem | Half | 32-bit | 1 … 5 |
| 37L14xx | Serial I/O SST 8, 16 and 128 Port Adapters[14] | Half | 32-bit | 1 … 5 |
| | **Systems Management** | | | |
| 09N7585 | Remote Supervisor Adapter | Half | 32-bit | 2 |


Slot 1- 33MHz, 32-bit, 5V or Universal
Slot 2- 33MHz, 32-bit, 5V or Universal
Slot 3- 33MHz, 64-bit, 5V or Universal
Slot 4- 33MHz, 64-bit, 5V or Universal
Slot 5- 33MHz, 64-bit, 5V or Universal
All Slots-Full Length
External Connector Access

1. A 64-bit adapter installed into a 32-bit slot will transfer data at 32-bit rates. Adapters rated at 66MHz will operate at 33MHz when installed in a 33MHz slot. 33MHz adapters will reduce 66MHz buses to 33MHz.
2. The xSeries 220 has five full-length, 33MHz PCI expansion slots, three 64-bit and two 32-bit.
3. xSeries 220 has an integrated Ultra160 SCSI Controller with a single internal channel and includes a five-drop, multi-mode terminated LVD SCSI cable.
4. ServeRAID-4L Ultra160 SCSI Controller is powered by a 100MHz Intel i960 processor and provides a single channel, 16MB of ECC cache and either one internal or one external Ultra160 connection. External connector is 0.8mm VHDCI.
5. ServeRAID-4M Ultra160 SCSI Controller is powered by a 100MHz Intel i960 processor and provides two channels, 64MB of battery-backed ECC cache and two external 0.8mm VHDCI Ultra160 connectors.
6. ServeRAID-4Mx Ultra160 SCSI Controller is powered by a 100MHz Intel Zion GC80303 processor that provides 64MB of battery-backed ECC cache and two internal and two external Ultra160 connections (only two connectors may be used). External connections are 0.8mm VHDCI.
7. ServeRAID-4Lx Ultra160 SCSI Controller is powered by a 100MHz Intel Zion GC80303 processor and provides a single channel, 32MB of ECC cache and either one internal or one external Ultra160 connection. External connector is 0.8mm VHDCI.
8. PCI Wide Ultra160 SCSI Adapter (P/N 19K4646) provides a single channel with one internal connector, a five-drop multi-mode terminated LVD SCSI cable and one external 0.8mm VHDCI connector. Only one of the two connectors may be utilized.
9. PCI Fast/Wide Ultra SCSI Adapter (P/N 02K3454) provides one external 68-pin high density connector that supports external SCSI devices such as tape enclosures.
10. The xSeries 220 includes an integrated full-duplex, 10/100Mbps Ethernet controller.
11. In a fault-tolerant networking environment, using the fault-tolerant software delivered with the Ethernet adapters of a single manufacturer is recommended. Installing fault-tolerant solutions provided by multiple manufacturers may cause failures if the intermediate drivers provided with the adapters are not compatible.The onboard Ethernet is Intel-based, which is compatible with the two Intel-based optional Ethernet adapters (P/N 06P3601, 06P3701).
12. The Wake on LAN feature of this adapter is supported only in slot one.
13. xSeries 220 includes two USB ports, two high-speed serial/asynchronous ports, (NS16550A software compatible) and one high-speed parallel port supporting devices using SSP/EPP/ECP protocols adhering to the IEEE 1284 Standard.
14. See Appendix E for details on Serial I/O Options and configuration limitations.

## xSeries 220 Power, Monitors & Accessories

| Part Number | Description |
|---|---|
| | **Power[1]** |
| | **Free Standing Uninterruptible Power Supply (UPS)[2]** |
| 94G3134 | APC Smart-UPS 700 |
| 94G3135 | APC Smart-UPS 1000 |
| 94G3136 | APC Smart-UPS 1400 |
| | **Rack Mount Uninterruptible Power Supply (UPS)[2]** |
| 94G6674 | APC Smart-UPS 1400RMB[3] |
| 94G6676 | APC Smart-UPS 3000RMB[3] |
| 37L6861 | APC Smart-UPS 5000RMB[4] |
| | **Monitors[5]** |
| 633347N | E51 Color Monitor 15in (350mm, 13.8in Viewable Image Size), stealth black[6] |
| 6331N2N | E54 Color Monitor 15in (350mm, 13.8in Viewable Image Size), stealth black[6] |
| 6332J1N | E74 Color Monitor 17in (403mm, 15.9in Viewable Image Size), stealth black[6] |
| 66274AN | G78 Color Monitor 17in (406.4mm, 16in Viewable Image Size), stealth black[6] |
| 9511AG4 | T540 Flat Panel Color Monitor 15in (381mm, 15in viewable image), stealth black[7] |

1. The xSeries 220 includes a 330W voltage sensing power supply and a single line cord.
2. For runtimes and UPS attributes see Appendix C: UPS Runtime Estimate.
3. Height is 3U. See Rack Cabinets and Options section for supported IBM racks.
4. Height is 5U. See Rack Cabinets and Options section for supported IBM racks.
5. The xSeries 220 includes an integrated SVGA controller (S3 Savage4 Chipset) with 8MB of video memory.
6. Installation within a rack requires optional Monitor Compartment (P/N 94G7444).
7. Installation within a rack requires optional Netfinity Flat Panel Monitor Rack Mount Kit II (P/N 37L6888) and Netfinity Rack Keyboard Tray (P/N 28L4707). A space saver keyboard may coexist within the same 28L4707 keyboard tray.

| Part Number | Description |
|---|---|
| | **Conversion Kits** |
| 09N4300 | 4Ux20D Tower-to-Rack Kit |
| | **Rack and NetBAY[1]** |
| | Refer to the Rack Cabinets and Options section for information concerning IBM racks and rack-supported devices. |
| | **Keyboard and Mouse[2]** |
| 28L3644 | Space Saver II Keyboard[3, 4] |
| 01K1260 | TrackPoint IV 104-key Black Keyboard[4, 5] |
| 28L3621 | Preferred Keyboard (stealth black)[5] |
| 28L3673 | Sleek 2-button Stealth Black Mouse |

1 Rack installation of an xSeries 220 requires 4Ux20D Tower-to-Rack Kit (P/N 09N4300) and one of the racks listed in the Rack Cabinets and Options section.
2. The xSeries 220 includes both a mouse and nonspace saver keyboard.
3. Installation within a rack requires optional keyboard tray (P/N 28L4707) which stows in “ready-to-use” position.
4. Advanced TrackPoint IV features are not available on IBM xSeries or Netfinity systems.
5. Installation within a rack requires optional keyboard tray (P/N 28L4707). This keyboard cannot share a keyboard tray with a flat panel display.

## xSeries 220 Tape Options

| Part Number | Tape Drives | Bays Supported | SCSI Interface (bit) | Form Factor | Termination Included | 68/50-pin Converter Incl | Ext Tape Enclosures[1] |
|---|---|---|---|---|---|---|---|
| 09N4041 | 12/24GB DDS/3 4mm Internal SCSI Tape Drive[2, 3] | 2 | 8 | 89mm (3.5in) HH or 133mm (5.25in) HH | Y | Y | 3510020, 3551001 |
| 09N4042 | 10/20GB NS Internal SCSI Tape Drive[2, 3] | 2, 4 | 8 | 89mm (3.5in) SL or 133mm (5.25in) HH | Y | Y | 3510020, 3551001 |
| 00N7991 | 20/40GB DDS/4 4mm Internal Tape Drive[3] | 2 | 16 Ultra2 LVD | 89mm (3.5in) HH or 133mm (5.25in) HH | N | - | 3510020[4], 3551001[5] |
| 00N8016 | 100/200GB LTO Tape Drive | - | 16 Ultra2 LVD | 133mm (5.25in) FH | N | - | 3551001[5] |
| 24P2398 | 40/80GB Half-High DLTVS Internal SCSI Tape Drive[3] | 2 | 16 Ultra2 LVD | 133mm (5.25in) HH | N | - | 3551001[5] |
| | **Tape Autoloaders** | | | | | | |
| 00N7992 | 120/240GB DDS/4 Tape Autoloader | - | 16 Ultra2 LVD | 133mm (5.25in) FH | N | - | 3551001[5] |
| | **External Tape Libraries[6]** | | | | | | |
| 3570C2x | Magstar MP 3570 Tape Subsystem | - | HVD | 6U Rack | Y | - | - |
| | **External Tape Enclosures** | | | | | | |
| 3510020 | External Half High SCSI Storage Enclosure[7] | - | 8, 16 | Desktop | N | N | - |
| 3551001 | NetMEDIA Storage Expansion Unit EL[8] | - | 16 | Rack | Y | N | - |
| 10L7113 | NetMEDIA Systems Management Adapter[9] | - | 16 LVD | - | N | N | 3551001 |
| | **Associated Options** | | | | | | |
| 00N7956 | 68-pin External Multimode LVD/SE SCSI Terminator | - | 16 LVD/SE | External | Y | N | 3510020 |
| 10K2340 | Media Bay Tray and LVD Cable Kit[3, 5] | - | 16 LVD | Internal | Y | N | 3551001 |

Note: All models include an Ultra160 SCSI controller with a five-drop multi-mode terminated LVD SCSI cable. Single-ended devices attached to this cable will limit the entire SCSI bus to single-ended performance. All tape drives and external tape enclosures are supported by PCI Wide Ultra160 SCSI Adapter (P/N 19K4646) which includes a five-drop multi-mode terminated LVD SCSI cable and an external 0.8-mm VHDCI connector.

1. To determine cable requirements, note the tape drive's SCSI interface, the appropriate SCSI controller from the system configurator section, and the desired enclosure, then refer to Appendix D: Cables - Storage Units - Controllers.
2. This single-ended device will limit the SCSI bus to which it is attached to Ultra SCSI speeds. To provide a dedicated tape SCSI bus, install PCI Wide ultra160 SCSI Adapter (P/N 19K4646) which includes a five-drop multi-mode LVD SCSI cable.
3. RAID configurations, where the standard SCSI cable is attached to a RAID adapter, require the two-drop multi-mode terminated LVD SCSI cable included with Media Bay Tray and LVD Cable Kit (P/N 10K2340) for attachment of the tape drive to the standard SCSI controller.
4. Requires 68-pin External Multimode LVD/SE SCSI Terminator (P/N 00N7956)
5. LVD support for LVD devices installed in a NetMEDIA Storage Expansion Unit EL (P/N 3551001) requires replacement of the standard single-ended internal cables with one or more (depending on configuration) cables from Media Bay Tray and LVD Cable Kit (P/N 10K2340) which contains a single two-drop multi-mode terminated cable. If the standard cables are used for attachment to LVD devices, single-ended SCSI rules and bus speeds apply.
6. Tape library attributes and prerequisites are located in Appendix B: Tape Library Attributes.
7. Provides a black desktop 133mm (5.25in) half-high (HH) tape enclosure. Connector is configurable as 50-pin Centronix or 68-pin high density. Requires either tape drive self termination or 68-pin External Multimode LVD/SE SCSI Terminator (P/N 00N7956).
8. NetMEDIA Storage Expansion Unit EL (P/N 3551001) is a black 3U, 19in rack mountable tape enclosure which includes two full-high (FH) or four half-high (HH) extended length 133mm (5.25in) bays, two external 68-pin high density connectors and two internal four-drop single-ended terminated 16-bit SCSI cables for device attachment. Two power supplies and two power cords are also included. Tip: The front rail clips will need to be reversed and screwed in from behind to secure the unit in a 930842x rack.
9. NetMEDIA Systems Management Adapter (P/N 10L7113) may be installed in a 3551001 to provide repeater function, LVDS interface, aggregate cable lengths up to 12m when attached to an LVD SCSI controller, and auto-termination when the 3551001 is powered off. External connector is 0.8mm VHDCI.

Note: Additional tape attributes can be found in Appendix A: Tape Drive Attributes.

## xSeries 220 Sample Configurations

Note: The following sample configurations are for illustration only and may not be suitable for any specific customer installation. Contact your IBM Business Partner or IBM Marketing Representative for assistance with your specific configuration requirements.

### Internet Server

| Part Number | Description | Quantity |
|---|---|---|
| 8645-5AX | xSeries 220 1GHz/256KB, 128MB ECC, OPEN HOT-SWAP, 48X | 1 |
| 33L3142 | 128MB 133MHz SDRAM ECC RDIMM | 1[1] |
| 37L7205 | 18.2GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD | 2[2] |
| 00N7991 | 20/40GB DDS/4 4mm Internal Tape Drive | 1 |
| 6331N2N | E54 Color Monitor 15in (350mm, 13.8in Viewable Image Size), stealth black | 1 |
| 94G3134 | APC Smart-UPS 700 | 1 |

1. For a total of 256MB of system memory.
2. For a total of 36.4GB of internal storage.

An Internet server handles all requests from the Internet (Intranet or Extranet). Usually, this type of server has the same characteristics as a normal file server. The main difference is that an Internet server talks a different language (TCP/IP vs NETBEUI or IPX/SPX) and often needs to do an extra security check (firewall). In the case of an Internet server, the server itself talks mostly to just one client, the Internet Service Provider (ISP), instead of many clients as a file server does.

With this is mind, the xSeries 220 was selected to provide an affordable price point for the growing Internet server market with two-way Pentium III processing, 256MB of system memory (expandable to 4GB), and power protection with an APC Smart-UPS.

The network configuration depends on the method that will be used to connect the server to the Internet. Usually fast Ethernet routers are used, but if other methods are used you can add the appropriate adapter. The configuration includes a tape backup unit for secure backup of critical data in the event of a system or storage failure.

### File and Print Server

| Part Number | Description | Quantity |
|---|---|---|
| 8645-4AX | xSeries 220 933MHz/256KB, 128MB ECC, OPEN HOT-SWAP, 48X | 1 |
| 33L3142 | 128MB 133MHz SDRAM ECC RDIMM | 1[1] |
| 37L7205 | 18.2GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD | 3[2] |
| 00N7991 | 20/40GB DDS/4 4mm Internal Tape Drive | 1 |
| 6331N2N | E54 Color Monitor 15in (350mm, 13.8in Viewable Image Size), stealth black | 1 |
| 94G3134 | APC Smart-UPS 700 | 1 |

1. For a total of 256MB of system memory.
2. For a total of 54.6GB of internal storage.

A small business or departmental server is usually required to perform all typical server functions while servicing up to 100 users in a normal workgroup computing environment, but doesn't require the high-end performance and fault-tolerance properties of larger servers.

The sample configuration above consists of an xSeries 220 with 256MB of memory and 54.6GB of HDD space. It has enough processor power and memory to run most current network operating systems comfortably and enough hard disk drive space to store a significant amount of data with additional external storage expansion still available. Demanding network traffic is effectively handled by the standard 100Mbps Ethernet connection.

This configuration also includes a tape backup unit, monitor, and a UPS to keep the system protected during power surges and outages.

### Application Server

| Part Number | Description | Quantity |
|---|---|---|
| 8645-42X | xSeries 220 933MHz/256KB, 128MB ECC, 18.2GB, 48X | 1 |
| 10K3819 | Netfinity 933MHz with 133MHz FSB and 256KB Advanced Transfer Cache Pentium III Upgrade Processor | 1 |
| 33L3144 | 256MB 133MHz SDRAM ECC RDIMM | 1[1] |
| 37L6091 | ServeRAID-4L Ultra160 SCSI Controller | 1 |
| 37L7205 | 18.2GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD | 2[2] |
| 10K2340 | Media Bay Tray and LVD Cable Kit[3] | 1 |
| 00N7991 | 20/40GB DDS/4 4mm Internal Tape Drive NS Internal SCSI Tape Drive | 1 |
| 6331N2N | E54 Color Monitor 15in (350mm, 13.8in Viewable Image Size), stealth black | 1 |
| 94G3134 | APC Smart-UPS 700 | 1 |

1. For a total of 384MB of system memory.
2. Three HDDs are used for RAID 5 protection. Effective capacity is two HDDs or 36.4GB
3. Cable for dedicated attachment of tape to standard controller.

An application server differs from a file and print server in that it has a higher workload in providing application serving requirements for users. With this in mind, the xSeries 220 was selected to provide an affordable price point for an application server with two-way Pentium III processing, 384MB of system memory (expandable to 4GB), and availability features such as RAID-protected internal storage and power protection with an APC Smart-UPS.

# IBM xSeries 230 and Netfinity 5100

| Part Number | Processor Speed (MHz)[5] | Number of Processors (Std/Max) | L2 ECC Cache (KB) | Memory (Std/Max) (R = RDIMM)[2] | Form Factor | Power Supply Quantity (Std/Max) | Hot-Swap (Power, Slots, HDD, Fans) | Redundancy (Optional, Standard)[3] | Adv System Management Processor | Onboard Ethernet (Mbps) | SCSI Controller (Dual, Ultra, RAID) | Removable Media Bays (Total/Avail) | Internal Hard Disk Drive (Std/Max) | CD-ROM (IDE)[4] | Bays (Total/Avail) | Slots (Total/Avail) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **xSeries 230 / Netfinity 5100 At-A-Glance** | | | | | | | | | | | | | | | | |
| 8658-51Y | 933 | 1/2 | 256 | 128MB(R)/4GB | Tower | 1/3 | O - Power S - HDD | O - Power | Y | 10/100 | D,U160 | 4/2 | 0/ 440.4GB | 40X-17X | 10/8 | 5/5 |
| 8658-5RY[1] | 933 | 1/2 | 256 | 128MB(R)/4GB | Rack (5U) | 1/3 | O - Power S - HDD | O - Power | Y | 10/100 | D,U160 | 4/2 | 0/ 440.4GB | 40X-17X | 10/8 | 5/5 |
| 8658-61Y[6] | 1GHz | 1/2 | 256 | 128MB(R)/4GB | Tower | 1/3 | O - Power S - HDD | O - Power | Y | 10/100 | D,U160 | 4/2 | 0/ 440.4GB | 40X-17X | 10/8 | 5/5 |
| 8658-6RY[1, 6] | 1GHz | 1/2 | 256 | 128MB(R)/4GB | Rack (5U) | 1/3 | O - Power S - HDD | O - Power | Y | 10/100 | D,U160 | 4/2 | 0/ 440.4GB | 40X-17X | 10/8 | 5/5 |

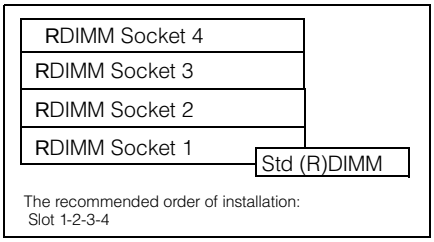
1. Housed in a 19in rack-mountable drawer and ships standard without a keyboard or mouse. See Rack Cabinets and Options section for supported IBM racks.
2. High-speed, 133MHz SDRAM.
3. Up to two additional 250W Hot-Swap Redundant Power Supplies (P/N 33L3760) and a single Hot-Swap Power Supply Expansion Kit (P/N 37L6881) are required for power supply redundancy. See xSeries 230 / Netfinity 5100 Power, Monitor & Accessories for additional information.
4. Variable read rate. Actual playback speed will vary and is often less than the maximum possible.
5. Intel Pentium III processor with advanced transfer L2 cache and 133MHz FSB.
6. This model is an IBM xSeries 230.

**xSeries 230 / Netfinity 5100 Processors**

| Part Number | Processor Upgrades | SMP Support[1] | Processor Speed Upgrade[2] |
|---|---|---|---|
| 19K4631 | Netfinity 933MHz 133MHz FSB/256KB Upgrade with Pentium III Processor | 5xY | - |
| 19K4640 | 1GHz Upgrade with 133MHz FSB and 256KB Advanced Transfer Cache Pentium III Processor | 6xY | 5xY |

1. One additional processor may be installed, providing a maximum of two. All processors must be identical in type, speed, and cache size.
2. Requires removal of the standard processor. A maximum of two processors may be installed. All processors must be identical in type, speed and cache size. Upgrades may require a BIOS update. To obtain the latest Flash BIOS, access www.pc.ibm.com/support and enter machine "Type-Model" in Quick Path. Select "Downloadable files" and then "BIOS".

## xSeries 230 / Netfinity 5100 Memory




The recommended order of installation:
Slot 1-2-3-4

| Part Number | Memory Description[1] |
|---|---|
| 33L3123 | 128MB 133MHz SDRAM ECC RDIMM II |
| 33L3125 | 256MB 133MHz SDRAM ECC RDIMM II |
| 33L3127 | 512MB 133MHz SDRAM ECC RDIMM II |
| 33L3129 | 1GB 133MHz SDRAM ECC RDIMM II |

1. The recommended order of installation is in sequence from Socket 1 to Socket 4. Memory size is not a factor.

| Total Memory[1] | Quantity of RDIMMs Added | | | |
|---|---|---|---|---|
| 128MB (1 x 128) Models | 128MB (33L3123) | 256MB (33L3125) | 512MB (33L3127) | 1GB (33L3129) |
| 256MB | 1 | - | - | - |
| 384MB | 2 or | 1 | - | - |
| 512MB | 3 | - | - | - |
| 640MB | - | 2 or | 1 | - |
| 896MB | - | 3 | - | - |
| 1024MB | - | 4[2] | - | - |
| 1152MB | - | - | 2 or | 1 |
| 1664MB | - | - | 3 | - |
| 2048MB | - | - | 4[2] | - |
| 2176MB | - | - | - | 2 |
| 3200MB | - | - | - | 3 |
| 4096MB (max) | - | - | - | 4[2] |

This table does not represent all possible memory configurations. Memory modules may vary in price per MB. Selection of smaller RDIMMs may provide a more cost-effective alternative to using larger RDIMMs.
1. Network operating systems may limit the maximum amount of addressable memory. See operating system specifications for further information.
2. Requires removal of standard memory.

## xSeries 230 / Netfinity 5100 Hard Disk Drive (HDD) Storage

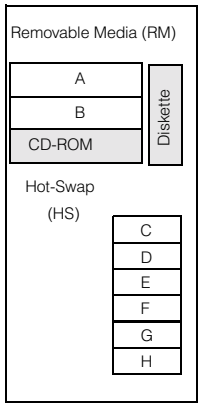
| Total Int Storage[1] | 7200RPM HDDs | | | 10,000RPM HDDs | | | | 15,000RPM HDDs | |
|---|---|---|---|---|---|---|---|---|---|
| | 9.1GB (37L7201) | 18.2GB (37L7202) | 36.4GB (37L7203) | 9.1GB (37L7204) | 18.2GB (37L7205) | 36.4GB (37L7206) | 73.4GB (06P5756) | 9.1GB (19K0655) | 18.2GB (19K0656) |
| 0GB | Standard on base models | | | | | | | | |
| 9.1GB | 1 | - | - | 1 | - | - | - | 1 | - |
| 18.2GB | 2 | 1 | - | 2 | 1 | - | - | 2 | 1 |
| 27.3GB | 3 | - | - | 3 | - | - | - | 3 | - |
| 36.4GB | 4 | 2 | 1 | 4 | 2 | 1 | - | 4 | 2 |
| 45.5GB | 5 | - | - | 5 | - | - | - | 5 | - |
| 54.6GB | 6 | 3 | - | 6 | 3 | - | - | 6 | 3 |
| 72.8GB | - | 4 | 2 | - | 4 | 2 | - | - | 4 |
| 91GB | - | 5 | - | - | 5 | - | - | - | 5 |
| 109.2GB | - | 6 | 3 | - | 6 | 3 | - | - | 6 |
| 145.6GB | - | - | 4 | - | - | 4 | - | - | - |
| 182GB | - | - | 5 | - | - | 5 | - | - | - |
| 218.4GB | - | - | 6 | - | - | 6 | - | - | - |
| 220.2GB | - | - | - | - | - | - | 3 | - | - |
| 293.6GB | - | - | - | - | - | - | 4 | - | - |
| 367GB | - | - | - | - | - | - | 5 | - | - |
| 440.4GB (max) | - | - | - | - | - | - | 6 | - | - |

This table does not represent all possible HDD configurations. Nonhot-swap HDDs installed in removable media bays are not included in this table.
1. Select a total storage row then select the quantity of HDDs from a column corresponding to the HDD of choice. Total Internal Storage listed is within +/- 0.2GB unless otherwise noted.

| Bay | Form Factor | Height | Front Access | Usage |
|---|---|---|---|---|
| A | 133mm (5.25in) | HH[1] | Yes | Open |
| B | 133mm (5.25in) | HH[1] | Yes | Open |
| - | 133mm (5.25in) | SL | Yes | IDE CD-ROM |
| - | 89mm (3.5in) | SL | Yes | Diskette |
| C … H | HS | SL[2] | Yes | Open |

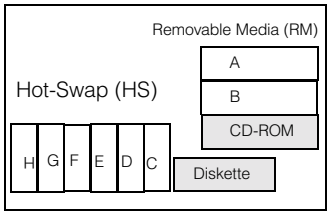
1. Two half-high (HH) bays can be combined to support a single full-high (FH) device. Installation of devices in Bays A or B may require Netfinity Hot-Swap Power Supply Expansion Kit (P/N 37L6881) and at least one Netfinity 250W Hot-Swap Redundant Power Supply (P/N 33L3760). Installation of HDDs in Bays A and B also requires Media Bay Tray and LVD Cable Kit (P/N 10K2340). One or more optional power supplies are recommended for configurations exceeding four SL hot-swap hard disk drives and two PCI adapters.
2. Two slim-line (SL) bays (C/D, E/F, G/H) can be combined to support a single half-high (HH) device.

Tower Model View




For clarity purposes, bay labels in these diagrams are for reference by the accompanying tables and are not the actual labels. Refer to the documentation shipped with the system for further details on actual labels.

Rack Model View




| Part Number | Description | RPM | Height | Bays Supported | Max Qty |
|---|---|---|---|---|---|
| **Hot-Swap Ultra160 HDDs** | | | | | |
| 37L7201 | 9.1GB Ultra160 SCSI Hot-Swap SL HDD | 7200 | SL | C … H | 6 |
| 37L7202 | 18.2GB Ultra160 SCSI Hot-Swap SL HDD | 7200 | SL | C … H | 6 |
| 37L7203 | 36.4GB Ultra160 SCSI Hot-Swap SL HDD | 7200 | SL | C … H | 6 |
| 37L7204 | 9.1GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD | 10000 | SL | C … H | 6 |
| 37L7205 | 18.2GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD | 10000 | SL | C … H | 6 |
| 37L7206 | 36.4GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD | 10000 | SL | C … H | 6 |
| 19K0655 | 9.1GB 15Krpm Ultra160 SCSI Hot-Swap HDD | 15000 | SL | C … H | 6 |
| 19K0656 | 18.2GB 15Krpm Ultra160 SCSI Hot-Swap HDD | 15000 | SL | C … H | 6 |
| 06P5756 | 73.4GB 10Krpm Ultra160 SCSI Hot-Swap SL HDD | 10000 | SL | C … H | 6 |
| **Non-Hot-Swap Ultra160 HDDs[1]** | | | | | |
| 00N8204 | 9.1GB 7200rpm Ultra160 SCSI HDD | 7200 | SL | A, B[2] | 2 |
| 00N8205 | 18.2GB 7200rpm Ultra160 SCSI HDD | 7200 | SL | A, B[2] | 2 |
| 00N8206 | 36.4GB 7200rpm Ultra160 SCSI HDD | 7200 | SL | A, B[2] | 2 |
| **Associated Options** | | | | | |
| 10K2340 | Media Bay Tray and LVD Cable Kit[3] | - | - | A+B | 1 |
| 33L3760 | 250W Hot-Swap Redundant Power Supply | - | - | - | - |
| 37L6881 | Hot-Swap Power Supply Upgrade Kit[4] | - | - | - | - |

| External Storage Expansion Units[5] | | Form Factor |
|---|---|---|
| 35311RU | EXP300 Storage Expansion Unit[6] | Rack (3U) |
| 09N7296 | EXP300 Rack-to-Tower Conversion Kit | - |
| 35601RU | FAStT EXP500 Storage Expansion Unit[7] | Rack (3U) |
| 35421RU | FAStT200 Storage Server[8, 9] | Rack (3U) |
| 35422RU | FAStT200 HA Storage Server[8] | Rack (3U) |
| 19K1121 | FAStT200 Redundant RAID Controller | - |

1. Installation of nonhot-swap HDDs requires both the tray and the cable in the Media Bay Tray and LVD Cable Kit (P/N 10K2340).
2. Installation of devices in Bays A or B may require Netfinity Hot-Swap Power Supply Expansion Kit (P/N 37L6881) and at least one Netfinity 250W Hot-Swap Redundant Power Supply (P/N 33L3760). An optional SCSI cable is required. A two-drop terminated LVD SCSI is included with both Media Bay Tray and LVD Cable Kit (P/N 10K2340) and Hot-Swap Power Supply Upgrade Kit (P/N 37L6881).
3. Media Bay Tray and LVD Cable Kit (P/N 10K2340) contains a two-drop terminated LVD SCSI cable and the hardware required to convert two half-high 5.25in removable media bays into two nonhot-swap 7200RPM HDD bays.
4. Hot-Swap Power Supply Upgrade Kit (37L6881) contains a hot-swap power backplane that supports installation for up to three hot-swap power supplies.
5. To configure a SCSI storage device, select an optional SCSI controller then refer to Appendix D: Cables - Storage Units - Controllers to confirm the controller supports the desired External Storage Expansion Unit and to select a supported cable. For HDD or other expansion unit options, see the specific expansion unit section. For Fibre Channel storage devices, refer to the Fibre Array Solutions section.
6. EXP300 includes a single 2M Ultra2 SCSI cable and dual hot-swap 500W redundant power supplies, each with its own power cord.
7. FAStT EXP500 Storage Expansion Unit (P/N 35601RU) includes dual hot-swap 350W power supplies, each with its own power cord.
8. The FAStT200 includes two hot-swap, 350W auto-ranging redundant power supplies, each with its own power cord.
9. Can be upgraded to FAStT200 HA Storage Server through the addition of a FAStT200 Redundant RAID Controller (P/N 19K1121).

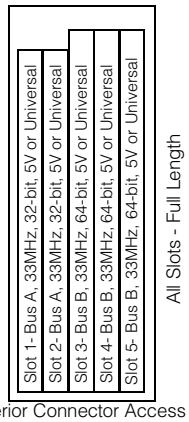
## xSeries 230 / Netfinity 5100 Internal SCSI Cabling

The xSeries 230 and Netfinity 5100 contain a DASD backplane supporting six hot-swap, SCA-2 compliant drive bays. The backplane is connected to channel A of the integrated dual-channel, Ultra160 SCSI controller connector through a 16-bit LVD SCSI cable. If internal RAID support is required, this cable can be used to connect to a supported RAID adapter rather than the integrated SCSI controller. No external SCSI port is included.

A two-drop, 16-bit LVD SCSI cable with integrated terminator is also included with the Netfinity Hot-Swap Power Supply Expansion Kit (P/N 37L6881).This cable is included in the expansion kit because installation of SCSI devices in bays A and B may require additional power. The two-drop cable supports up to two internal devices in these bays. This cable can be attached to channel B of the integrated dual-channel Ultra160 SCSI controller or to a supported SCSI adapter.

## xSeries 230 / Netfinity 5100 I/O Options

| Part Number | Description | Adapter Length | PCI Support[23] | Slots Supported |
|---|---|---|---|---|
| | **Storage Controllers[1]** | | | |
| 37L6091 | ServeRAID-4L Ultra160 SCSI Controller[2] | Full | 64-bit | 1 … 5 |
| 37L6080 | ServeRAID-4M Ultra160 SCSI Controller[3] | Full | 64-bit | 1 … 5 |
| 37L6889 | ServeRAID-4H Ultra160 SCSI Controller[4] | Full | 64-bit | 1 … 5 |
| 06P5736 | ServeRAID-4Mx Ultra160 SCSI Controller[5] | Full | 64-bit | 1 … 5 |
| 06P5740 | ServeRAID-4Lx Ultra160 SCSI Controller[6] | Half | 64-bit | 1 … 5 |
| 19K4646 | PCI Wide Ultra160 SCSI Adapter[7] | Half | 64-bit | 1 … 5 |
| 02K3454 | PCI Fast/Wide Ultra SCSI Adapter[24] | Half | 32-bit | 1 … 5 |
| | **Fibre Storage Controllers and Options[8]** | | | |
| 00N6881 | Netfinity FAStT Host Adapter | Half | 64-bit | 1 …5 |
| 35521RU | FAStT500 Storage Server | - | - | - |
| 35421RU | FAStT200 Storage Server | - | - | - |
| 35422RU | FAStT200 HA Storage Server | - | - | - |
| 35341RU | SAN Fibre Channel Managed Hub | - | - | - |
| 2109S08 | SAN Fibre Channel Switch, 8-Port | - | - | - |
| 2109S16 | SAN Fibre Channel Switch, 16-Port | - | - | - |
| 2108R3L | SAN Data Gateway Router Ultra SCSI LVD Port[9] | - | - | - |
| | **Networking[10]** | | | |
| | **Ethernet[11]** | | | |
| 19K4401 | Netfinity Gigabit Ethernet Adapter (copper) | Half | 64-bit | 1 … 5 |
| 06P3601 | 10/100 Ethernet Server Adapter[12] | Half | 32-bit | 1 … 5 |
| 06P3701 | Gigabit Ethernet SX Server Adapter (fiber) | Half | 64-bit | 1 … 5 |
| 09N9901 | 10/100 EtherLink Server Adapter by 3Com[12] | Half | 32-bit | 1 … 5 |
| | **Token Ring** | | | |
| 34L0701 | Token-Ring 16/4 PCI Adapter 2 with Wake on LAN[12] | Half | 32-bit | 1 … 5 |
| 34L5201 | High-Speed 100/16/4 Token-Ring PCI Management Adapter[12] | Half | 32-bit | 1 … 5 |
| | **Communications[13]** | | | |
| 33L4618 | V.90 PCI Data/Fax Modem[14] | Half | 32-bit | 1 … 5 |
| 37L14xx | Serial I/O SST 8, 16 and 128 port adapters[15] | Half | 32-bit | 1 … 5 |
| | **Systems Management[16]** | | | |
| 01K7209 | Netfinity Advanced System Management PCI Adapter[17] | Full | 32-bit | 1 … 5 [18] |
| 03K9309 | Netfinity Advanced System Management Interconnect Cable Kit[19] | - | - | - |
| 36L9654 | Netfinity Advanced System Management Token-Ring Connection[20] | - | - | - |
| | **Host Attach** | | | |
| 9086001 | Netfinity ESCON Adapter[21] | Full | 32-bit | 1 … 5[22] |


Slot 1- Bus A, 33MHz, 32-bit, 5V or Universal
Slot 2- Bus A, 33MHz, 32-bit, 5V or Universal
Slot 3- Bus B, 33MHz, 64-bit, 5V or Universal
Slot 4- Bus B, 33MHz, 64-bit, 5V or Universal
Slot 5- Bus B, 33MHz, 64-bit, 5V or Universal
All Slots - Full Length
Exterior Connector Access

1. xSeries 230 / Netfinity 5100 includes a dual-port, dual-channel Ultra160 SCSI controller for internal use only. No standard external port is available. See "Internal SCSI Cabling" for cabling alternatives.
2. ServeRAID-4L Ultra160 SCSI Controller is powered by a 100MHz Intel i960 processor and provides a single channel, 16MB of ECC cache and either one internal or one external Ultra160 connection. External connector is 0.8mm VHDCI.
3. ServeRAID-4M Ultra160 SCSI Controller is powered by a 100MHz Intel i960 processor and provides two channels, 64MB of battery-backed ECC cache and two internal and two external Ultra160 connectors (only two connectors may be utilized). External connectors are 0.8mm VHDCI .
4. ServeRAID-4H Ultra160 SCSI Controller is powered by a 266MHz PowerPC 750 processor and provides 128MB of battery-backed ECC cache with two internal and up to four external Ultra160 connectors (only four connectors may be utilized). External connectors are 0.8mm VHDCI.
5. ServeRAID-4Mx Ultra160 SCSI Controller is powered by a 100MHz Intel Zion GC80303 processor that provides 64MB of battery-backed ECC cache and two internal and two external Ultra160 connections (only two connectors may be used). External connections are 0.8mm VHDCI.
6. ServeRAID-4Lx Ultra160 SCSI Controller is powered by a 100MHz Intel Zion GC80303 processor and provides a single channel, 32MB of ECC cache and either one internal or one external Ultra160 connection. External connectior is 0.8mm VHDCI.
7. PCI Wide Ultra160 SCSI Adapter (P/N 19K4646) provides a single channel with one internal connector, a five-drop multi-mode terminated LVD SCSI cable and one external 0.8mm VHDCI connector. Only one of the two connectors may be utilized.

8. See Fibre Array Solutions section for additional configuration information.
9. The 2108R3L SAN Data Gateway Router Ultra SCSI LVD port provides one integrated short-wave optical port and two SCSI ports for tape storage connections (LVD, HVD and single-ended).
10. xSeries 230 / Netfinity 5100 includes a full-duplex, 10/100Mbps Ethernet PCI controller.
11. In a fault-tolerant networking environment, using the fault-tolerant software delivered with the Ethernet adapters of a single manufacturer is recommended. Installing fault-tolerant solutions provided by multiple manufacturers may cause failures if the intermediate drivers provided with the adapters are not compatible.The onboard Ethernet is Intel-based, which is compatible with the two Intel-based optional Ethernet adapters (P/N 06P3601, 06P3701).
12. The Wake on LAN function of this option is not supported by this server.
13. xSeries 230 / Netfinity 5100 includes two USB ports, two serial and one parallel port.
14. Due to homologation variances, modem availability may differ by country.
15 See Appendix E for details on Serial I/O Options and configuration limitations.
16. The Netfinity Advanced Systems Management Processor and Interconnect Bus integrated into xSeries 230 / Netfinity 5100 works with Netfinity Director to provide significant system management function. When used with optional Netfinity Advanced System Management PCI Adapter (P/N 01K7209) and Netfinity Advanced System Management Interconnect Cable Kit (P/N 03K9309) additional management and control of up to 12 service processors from a remote console through a single modem or LAN connection is possible.
17. Includes PCI adapter, Netfinity Advanced System Management Interconnect Cable Kit components and 56W AC adapter, which requires a separate power source. Provides an integrated 10/100 Ethernet port and a PCMCIA slot to support optional Netfinity Advanced System Management Token-Ring Connection (P/N 36L9654).
18. A maximum quantity of one is supported.
19. Required for all xSeries / Netfinity servers containing a standard Advanced System Management Processor that are to be interconnected for system management support through a LAN or modem connection. Optional Netfinity Advanced System Management PCI Adapter (P/N 01K7209) includes the contents of this option. Up to 12 service processors may be interconnected (including standard and optional processors) with an aggregate connection length of no more than 91.4m (300ft). A customer-supplied Ethernet cable is required for each interconnection.
20. Contains an IBM Turbo 16/4 Token-Ring PCI card, which installs in the PCMCIA card slot of Netfinity Advanced System Management PCI Adapter, and a PC Card to nine-pin D-Shell cable which is routed to a rear chassis cut-out. The Netfinity Advanced System Management PCI Adapter's integrated Ethernet port and Netfinity Advanced System Management Token-Ring Connection cannot be connected or used together. To download the latest firmware, access www.pc.ibm.com/ww/eserver/xseries, select Support and Downloads, the server brand, Hardware Drivers … (in the Fixes menu), server family, model, then Advanced Systems Management in the Downloadable Files menu.
21. Provides an ESCON MIC and a DB9 Serial Port. Cables are not included but are available through S/390 channels. Contact your IBM representative for additional information.
22. A maximum of two 9086001 adapters (installed in nonadjacent slots) are supported in a single server.
23. A 64-bit adapter installed into a 32-bit slot will transfer data at 32-bit rates. Adapters rated at 66MHz will operate at 33MHz when installed in a 33MHz slot.
24. PCI Fast/Wide Ultra SCSI Adapter (P/N 02K3454) provides one external 68-pin high density connector that supports external SCSI devices such as tape enclosures.

## xSeries 230 / Netfinity 5100 Power, Monitors & Accessories

| Part Number | Description |
|---|---|
| | **Power** |
| 33L3760 | 250W Hot-Swap Redundant Power Supply[2] |
| 37L6881 | Hot-Swap Power Supply Expansion Kit[3] |
| | **Uninterruptible Power Supply (UPS)[4]** |
| 94G3135 | APC Smart-UPS 1000 |
| 94G3136 | APC Smart-UPS 1400 |
| 94G6674 | APC Smart-UPS 1400RMB[5] |
| 94G6676 | APC Smart-UPS 3000RMB[5] |
| 37L6861 | APC Smart-UPS 5000RMB[6] |
| | **Monitors[7]** |
| 633347N | E51 Color Monitor 15in (350mm, 13.8in Viewable Image Size), stealth black[8] |
| 6331N2N | E54 Color Monitor 15in (350mm, 13.8in Viewable Image Size), stealth black[8] |
| 6332J1N | E74 Color Monitor 17in (403mm, 15.9in Viewable Image Size), stealth black[8] |
| 66274AN | G78 Color Monitor 17in (406.4mm, 16in Viewable Image Size), stealth black[8] |
| 9511AG4 | T540 Flat Panel Color Monitor 15in (381mm, 15in viewable image), stealth black[9] |

1. xSeries 230 / Netfinity 5100 include single 250W, hot-swap power supply and a single 9ft 110V power cord with an IEC 320-C13 connector on the system end and NEMA 5-15P on the other end. Power supply redundancy may be achieved with the addition of optional 250W Hot-Swap Redundant Supply (P/N 33L3760). Hot-Swap Power Supply Upgrade Kit (P/N 37L6881) is required when optional power supplies are to be added. Redundancy for configurations of greater than 250W requires installation of a second optional supply. Additional power may be required when installing a SCSI device in bay A or B. One or more additional power supplies are recommended for configurations exceeding four SL hot-swap hard disk drives and two PCI adapters. To assist in determining when an additional power supply is required to preserve redundancy, a "Non-Redundant LED" is a standard feature.
2. 250W Hot-Swap Redundant Power Supply (P/N 33L3760) includes a single 6ft power cord for connection to a low voltage wall outlet. Hot-Swap Power Supply Expansion Kit (P/N 37L6881) must be installed prior to adding optional power supplies.
3. Hot-Swap Power Supply Expansion Kit (P/N 37L6881) includes a hot-swap power backplane, terminated two-drop LVD SCSI cable, and mounting brackets for DLT tape drives. Required when installing a second power supply or devices in the 133mm (5.25in) HH bays.
4. For runtimes and UPS attributes see Appendix C: UPS Runtime Estimate.
5. Height is 3U. See Rack Cabinets and Options section for supported IBM racks.
6. Height is 5U. See Rack Cabinets and Options section for supported IBM racks.
7. xSeries 230 / Netfinity 5100 uses an SVGA controller (S3 Savage4 chipset) with 8MB of video memory.
8. Installation within a rack requires optional Monitor Compartment (P/N 94G7444).
9. Installation within a rack requires optional Netfinity Flat Panel Monitor Rack Mount Kit II (P/N 37L6888) and Netfinity Rack Keyboard Tray (P/N 28L4707). A space saver keyboard may coexist within the same 28L4707 keyboard tray.

| Part Number | Description |
|---|---|
| **Conversion Kits** | |
| 37L6858 | 5Ux24D Tower-to-Rack Kit |
| **Rack and NetBAY[1]** | |
| | Refer to the Rack Cabinets and Options section for information concerning IBM racks and rack-supported devices. |
| **Keyboard and Mouse[2]** | |
| 28L3644 | Space Saver II Keyboard[3, 5] |
| 01K1260 | TrackPoint IV 104-Key Black Keyboard[4, 5] |
| 28L3621 | Preferred Keyboard (stealth black)[4] |
| 28L3673 | Sleek 2-Button Stealth Black Mouse |

1. xSeries 230 / Netfinity 5100 rack models are housed in a 19in rack-mountable drawer and require one of the racks listed in the Rack Cabinets and Options section.
2. Tower models include both a keyboard and mouse. Rack models include neither.
3. Installation within a rack requires optional keyboard tray (P/N 28L4707), which stows in ready-to-use position.
4. Installation within a rack requires optional keyboard tray (P/N 28L4707). This keyboard cannot share a keyboard tray with a flat panel display.
5. Advanced TrackPoint IV features are not available on IBM xSeries or Netfinity systems.



## xSeries 230 / Netfinity 5100 Tape Options

| Part Number | Tape Drives | Bays Supported | SCSI Interface (bit) | Form Factor | Termination Included | 68/50-pin Converter Incl | Ext Tape Enclosures |
|---|---|---|---|---|---|---|---|
| 00N7991 | 20/40GB DDS/4 4mm Internal Tape Drive[1] | A, B | 16 Ultra2 LVD | 89mm (3.5in) HH or 133mm (5.25in) HH | N | - | 3510020[4], 3551001[3] |
| 09N4040 | 20/40GB DLT Internal SCSI Tape Drive[1] | A+B | 8 | 133mm (5.25in) FH | N | Y | 3503B0X[4], 3551001 |
| 00N7990 | 40/80GB DLT Internal SCSI Tape Drive[1] | A+B | 16 Ultra2 LVD | 133mm (5.25in) FH | N | - | 3503B0X[4], 3551001[3] |
| 00N8017 | 60/120GB 8mm M2 SCSI Tape Drive[1] | A, B | 16 Ultra2 LVD | 133mm (5.25in) HH | N | - | 3510020[4], 3551001[3] |
| 00N8016 | 100/200GB LTO Tape Drive[1] | A+B | 16 Ultra2 LVD | 133mm (5.25in) FH | N | - | 3551001[3] |
| 24P2396 | 100/200GB LTO Half-High Tape Drive[1] | A, B | 16 Ultra2 LVD | 133mm (5.25in) HH | N | - | 3551001[3] |
| 24P2398 | 40/80GB Half-High DLTVS Internal SCSI Tape Drive[1] | A, B | 16 Ultra2 LVD | 133mm (5.25in) HH | N | - | 3551001[3] |
| **Tape Autoloaders** | | | | | | | |
| 3502108 | DLT Tape Autoloader | - | 16 | Desktop | Y | - | - |
| 00N7992 | 120/240GB DDS/4 Tape Autoloader[1] | A+B | 16 Ultra2 LVD | 133mm (5.25in) FH | N | N | 3551001[3] |
| 3600109 | 3600 Series 900GB/1.8TB LTO Tape Autoloader[2] | - | 16 Ultra2 LVD | Tower or 6U Rack | Y | - | - |
| **External Tape Libraries[5]** | | | | | | | |
| 3502x14 | DLT Tape Library | - | 16 | Desktop or Rack | Y | - | - |
| 3600220 | 3600 Series 2/4TB LTO Tape Library (Tower) | - | 16 Ultra2 LVD | Tower | Y | - | - |
| 3600R20 | 3600 Series 2/4TB LTO Tape Library (Rack) | - | 16 Ultra2 LVD | 5U Rack | Y | - | - |
| 09N4048 | 3600 Series LTO Drive Upgrade Option[6] | - | 16 Ultra2 LVD | - | N | - | - |
| **External Tape Enclosures** | | | | | | | |
| 3510020 | External Half High SCSI Storage Enclosure[7] | - | 8/16 | Desktop | N | N | - |
| 3503B0X | DLT External SCSI Enclosure[8] | | 16 | Desktop | N | N | - |
| 3551001 | NetMEDIA Storage Expansion Unit EL[9] | - | 16 | Rack | Y | N | - |
| 10L7113 | NetMEDIA Systems Management Adapter[10] | - | 16 LVD | - | N | N | 3551001 |
| **Associated Options** | | | | | | | |
| 00N7956 | 68-pin External Multimode LVD/SE SCSI Terminator | - | 16 LVD/SE | Ext | Y | N | 3510020, 3503B0X |
| 10K2340 | Media BayTray and LVD Cable Kit[1, 3] | - | 16 LVD | Int | Y | N | 3551001 |
| 37L6881 | Netfinity Hot-Swap Power Supply Expansion Kit[11] | - | 16 LVD | Int | Y | N | - |
| 33L3760 | 250W Hot-Swap Redundant Power Supply | - | - | - | - | - | - |

Note: Additional power may be required when installing a SCSI device in bay A or B. Configurations exceeding four SL hot-swap hard disk drives and two PCI adapters are recommended to include both Hot-Swap Power Supply Expansion Kit (P/N 37L6881) and at least one optional 250W Hot-Swap Redundant Power Supply (P/N 33L3760). An optional SCSI cable is required for attachment of media bay devices to Ultra160 controller B. No external SCSI port is available. External tape enclosures are supported by PCI Wide Ultra160 SCSI Adapter (P/N 19K4646) which has an external 0.8mm VHDCI connector.
1. Internal tape drives require the two-drop multi-mode terminated LVD SCSI cable included with either Media Bay Tray and LVD Cable Kit (P/N 10K2340) or Hot-Swap Power Supply Expansion Kit (P/N 37L6881).
2. If installed in a rack, a fixed shelf is required. Allow an additional 1U for the fixed shelf. One unit only per shelf is supported.
3. LVD support for LVD devices installed in a NetMEDIA Storage Expansion Unit EL (P/N 3551001) requires replacement of the standard single-ended internal cables with one or more (depending on configuration) cables from Media Bay Tray and LVD Cable Kit (P/N 10K2340) which contains a single two-drop multi-mode terminated cable. If the standard cables are used for attachment to LVD devices, single-ended SCSI rules and bus speeds apply.
4. Requires 68-pin External Multimode LVD/SE SCSI terminator (P/N 00N7956).
5. Tape library attributes and prerequisites are located in Appendix B: Tape Library Attributes.
6. Install in second drive bay of 3600 Series LTO Tape Libraries or in either of the two bays of 3600 Series 2-Drive 20-Cartridge Expander Module to increase performance. Includes an LTO (Ultrium) drive and a one-meter external LVD SCSI cable.
7. Provides a black desktop 133mm (5.25in) half-high (HH) tape enclosure. Connector is configurable as 50-pin Centronix or 68-pin high density. Requires either tape drive self-termination or 68-pin External Multimode LVD/SE SCSI Terminator (P/N 00N7956).
8. Provides a black desktop DLT tape enclosure with a 68-pin high density external connector. Requires termination by the tape drive or by installation of an External Multimode LVD/SE SCSI terminator (P/N 00N7956).
9. NetMEDIA Storage Expansion Unit EL (P/N 3551001) is a black 3U, 19in rack mountable tape enclosure which includes two full-high (FH) or four half-high (HH) extended length 133mm (5.25in) bays, two external 68-pin high density connectors and two internal four-drop single-ended terminated 16-bit SCSI cables for device attachment. Two power supplies and two power cords are also included. Tip: The front rail clips will need to be reversed and screwed in from behind to secure the unit in a 930842x rack.
10. NetMEDIA Systems Management Adapter (P/N 10L7113) may be installed in a 3551001 to provide repeater function, LVDS interface, aggregate cable lengths up to 12m when attached to an LVD SCSI controller, and auto-termination when the 3551001 is powered off. External connector is 0.8mm VHDCI.
11. Hot-Swap Power Supply Expansion Kit (P/N 37L6881) includes a hot-swap power backplane and two-drop multi-mode terminated LVD SCSI cable. Required when installing a second power supply.

Note: Additional tape attributes can be found in Appendix A: Tape Drive Attributes.

## xSeries 230 / Netfinity 5100 Sample Configurations

Note: The following sample configurations are for illustration only and may not be suitable for any specific customer installation. Contact your IBM Business Partner or IBM Marketing Representative for assistance with your specific configuration requirements.

### Internet Server

| Part Number | Description | Quantity |
|---|---|---|
| 8658-51Y | Netfinity 5100 933MHz/256KB, 128MB ECC, OPEN, 40X, PCI | 1 |
| 33L3123 | 128MB 133MHz SDRAM ECC RDIMM II | 1[1] |
| 37L6091 | ServeRAID-4L Ultra160 SCSI Controller | 1 |
| 37L7204 | 9.1GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD | 4[2] |
| 00N8017 | 60/120GB 8mm M2 SCSI Tape Drive | 1 |
| 6331N2N | E54 Color Monitor 15in (350mm, 13.8in Viewable Image Size), stealth black | 1 |
| 94G3135 | APC Smart-UPS 1000 | 1 |
| 37L6881 | Hot-Swap Power Supply Expansion Kit | 1 |
| 33L3760 | 250W Hot-Swap Redundant Power Supply | 1 |

1. For a total of 256MB of system memory.
2. Three HDDs are used for RAID 5 protection. One HDD is identified as a hot-spare. Effective capacity is two HDDs or 18.2GB.

An Internet server handles all requests from the Internet (Intranet or Extranet). Usually this type of server has the same characteristics as a file server. The main difference is that an Internet server talks a different language (TCP/IP vs NETBEUI or IPX/SPX) and often needs to do an extra security check (firewall). In the case of an Internet server, the server itself talks mostly to one client, the Internet Service Provider (ISP), instead of many clients as a file server does.

With this in mind, the Netfinity 5100 was selected to provide an affordable price point for the growing Internet server market, 256MB of system memory (expandable to 4GB, and availability features such as RAID-protected internal hot-swap storage and power protection with an APC Smart-UPS.

The network configuration depends on the method that will be used to connect the server to the Internet. Usually fast Ethernet routers are used, but if other methods are used, you can add the appropriate adapter. The configuration includes a tape backup unit for secure backup of critical data in the event of a system or storage failure.

### File and Print Server

| Part Number | Description | Quantity |
|---|---|---|
| 8658-61Y | xSeries 230 1GHz/256KB, 128MB ECC, OPEN, 40X, PCI | 1 |
| 33L3123 | 128MB 133MHz SDRAM ECC RDIMM II | 1[1] |
| 37L6091 | ServeRAID-4L Ultra160 SCSI Controller | 1 |
| 37L7204 | 9.1GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD | 5[2] |
| 00N8017 | 60/120GB 8mm M2 SCSI Tape Drive | 1 |
| 6331N2N | E54 Color Monitor 15in (350mm, 13.8in Viewable Image Size), stealth black | 1 |
| 94G3135 | APC Smart-UPS 1000 | 1 |
| 37L6881 | Hot-Swap Power Supply Expansion Kit | 1 |
| 33L3760 | 250W Hot-Swap Redundant Power Supply | 1 |

1. For a total of 256MB of system memory.
2. Four HDDs are used for RAID 5 protection. One HDD is identified as a hot-spare. Effective capacity is three HDDs or 27.3GB.

A small business or departmental server is usually required to perform all typical server functions while servicing up to 100 users in a normal workgroup computing environment, but doesn't require the high-end performance and fault-tolerance properties of larger servers.

The sample configuration above consists of an xSeries 230 with 256MB of memory (expandable to 4GB) and 27.3GB of RAID-protected HDD space. It has enough processor power and memory to run most current network operating systems comfortably and enough HDD space to store a significant amount of data with additional external storage expansion still available. Demanding network traffic is effectively handled by the standard 100Mbps Ethernet connection.

The configuration also includes a tape backup unit, monitor, and a UPS to keep the system protected during power surges and outages.

### Rack Mounted Application Server

| Part Number | Description | Quantity |
|---|---|---|
| 8658-5RY | Netfinity 5100 933MHz/256KB, 128MB ECC, OPEN, 40X, PCI (Rack 5U) | 1 |
| 19K4631 | 933MHz 133 FSB/256KB Upgrade with Pentium III Processor | 1 |
| 33L3125 | 256MB 133MHz SDRAM ECC RDIMM II | 1[1] |
| 37L6080 | ServeRAID-4M Ultra160 SCSI Controller | 1 |
| 37L7204 | 9.1GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD | 5[2] |
| 00N8017 | 60/120GB 8mm M2 SCSI Tape Drive | 1 |
| 6331N2N | E54 Color Monitor 15in (350mm, 13.8in Viewable Image Size), stealth black | 1 |
| 94G6674 | APC Smart-UPS 1400RMB | 1 |
| 33L3760 | 250W Hot-Swap Redundant Power Supply | 1 |
| 37L6881 | Hot-Swap Power Supply Expansion Kit | 1 |
| | Industry Standard 19in Rack, EIA-310D, min depth of 28in (711mm) | |
| 9306200 | Netfinity NetBAY22 | 1 |
| 28L3644 | Space Saver II Keyboard | 1 |
| 94G6670 | Blank Filler Panel Kit | 2 |

1. For a total of 384MB of system memory.
2. Five HDDs are used for RAID 5 protection. Effective capacity is four HDDs or 36.4GB.

An application server differs from a file and print server in that it has a higher workload in providing application serving requirements for users. With this in mind, the Netfinity 5100 was selected to provide an affordable price point for an application server with two-way Pentium III processing, 384MB of system memory (expandable to 4GB), and availability features such as battery-backed cache, RAID protected internal hot-swap storage and power protection with an APC Smart-UPS.

### xSeries 230 High Availability Cluster (P/N 25P1821 and 25P1822)[1]

(Refer to High Availability and Scalable Cluster Solutions section)

1. P/N 25P1821 includes Windows NT EE as the operating system for this integrated tower solution. P/N 25P1822 uses Windows 2000 Advanced Server.

# IBM xSeries 232

| Part Number | Processor Speed (GHz)[2] | Number of Processors (Std/Max) | L2 ECC Cache (KB) | Memory (Std/Max) (RDIMM)[3] | Form Factor | Power Supply Quantity (Std/Max) | Hot-Swap (Power, Slots, HDD, Fans) | Redundancy (Optional, Standard) | System Management Processor | Onboard Ethernet (Mbps) | SCSI Controller (Dual, Ultra, RAID) | Removable Media Bays (Total/Avail)[5] | Internal Hard Disk Drive (Std/Max) | CD-ROM (IDE)[7] | Bays (Total/Avail)[8] | Slots (Total/Avail) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **xSeries 232 At-A-Glance** | | | | | | | | | | | | | | | | |
| 8668-11X | 1 | 1/2 | 256 | 256MB/4GB | Tower | 1/3 | H | O - Power[4] | Y | 10/100 | D,U160 | 4/2 | 0/ 660.6GB[6] | 48X-20X | 10/8 | 5/5 |
| 8668-1RX[1] | 1 | 1/2 | 256 | 256MB/4GB | Rack (5U) | 1/3 | H | O - Power[4] | Y | 10/100 | D,U160 | 4/2 | 0/ 660.6GB[6] | 48X-20X | 10/8 | 5/5 |
| 8668-21X | 1.13 | 1/2 | 512 | 256MB/4GB | Tower | 1/3 | H | O - Power[4] | Y | 10/100 | D,U160 | 4/2 | 0/ 660.6GB[6] | 48X-20X | 10/8 | 5/5 |
| 8668-2RX[1] | 1.13 | 1/2 | 512 | 256MB/4GB | Rack (5U) | 1/3 | H | O - Power[4] | Y | 10/100 | D,U160 | 4/2 | 0/ 660.6GB[6] | 48X-20X | 10/8 | 5/5 |
| 8668-22X | 1.13 | 1/2 | 512 | 256MB/4GB | Tower | 2/3 | P, H | S - Power | Y | 10/100 | D,U160 | 4/2 | 0/ 660.6GB[6] | 48X-20X | 10/8 | 5/5 |
| 8668-2SX[1] | 1.13 | 1/2 | 512 | 256MB/4GB | Rack (5U) | 2/3 | P, H | S - Power | Y | 10/100 | D,U160 | 4/2 | 0/ 660.6GB[6] | 48X-20X | 10/8 | 5/5 |

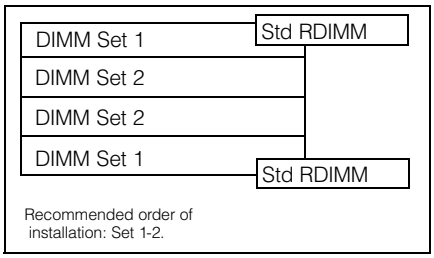
1. Housed in a 19in rack-mountable drawer and ships standard without a keyboard or mouse. See Rack Cabinets and Options section for supported IBM racks.
2. Intel Pentium III processor with advanced transfer L2 cache and 133MHz FSB.
3. High-speed, 133MHz SDRAM.
4. Power supply redundancy requires removal of the standard 385W power supply and the addition of either two or three 250W Hot-Swap Redundant Power Supply (P/N 33L3760) and an IBM eServer xSeries Hot-Swap Power Conversion Kit (P/N 24P3513). See xSeries 232 Power, Monitor & Accessories for additional information.
5. xSeries 232 includes two available removable media bays that can be converted to three slim-line (SL) hot-swap bays with the addition of optional 3-Pack Ultra160 Hot-Swap Expansion Kit (P/N 33L5050).
6. Assumes installation of optional 3-Pack Ultra160 Hot-Swap Expansion Kit (P/N 33L5050), which converts the two available removable media bays into three slim-line (SL) hot-swap bays.
7. Variable read rate. Actual playback speed will vary and is often less than the maximum possible.
8. The total number of bays can be increased to 11 by installing an optional 3-Pack Ultra160 Hot-Swap Expansion Kit (P/N 33L5050), which converts the two available removable media bays to three SL hot-swap HDD bays.

## xSeries 232 Processors

| Part Number | Processor Upgrades | SMP Support[1] | Processor Speed Upgrade[2] |
|---|---|---|---|
| 24P3511 | xSeries 1GHz/133MHz, 256KB Cache Upgrade with Pentium III Processor | 1xX | - |
| 24P3512 | xSeries 1.13GHz/133MHz, 512KB Cache Upgrade with Pentium III Processor SVR | 2xX | 1xX |

1. One additional processor may be installed, providing a maximum of two. All processors must be identical in type, speed, and cache size.
2. Requires removal of the standard processor. A maximum of two processors may be installed. All processors must be identical in type, speed and cache size. Upgrades may require a BIOS update. To obtain the latest Flash BIOS, access www.pc.ibm.com/support and enter machine "Type-Model" in Quick Path. Select "Downloadable files" then "BIOS."

## xSeries 232 Memory




| Part Number | Memory Description[1] |
|---|---|
| 33L3320 | IBM 128MB PC133 ECC SDRAM RDIMM |
| 33L3322 | IBM 256MB PC133 ECC SDRAM RDIMM |
| 33L3324 | IBM 512MB PC133 ECC SDRAM RDIMM |
| 33L3326 | IBM 1GB PC133 ECC SDRAM RDIMM |

1. Install memory options in pairs beginning with set 1.

| Total Memory[1] | Quantity of RDIMMs Added | | | |
|---|---|---|---|---|
| 256MB (2 x 128) Models | 128MB (33L3320) | 256MB (33L3322) | 512MB (33L3324) | 1GB (33L3326) |
| 512MB | 2 | - | - | - |
| 768MB | - | 2 | - | - |
| 1024MB[2] | - | 4 | - | - |
| 1280MB | - | - | 2 | - |
| 1152MB[2] | - | - | 4 | - |
| 2.25GB | - | - | - | 2 |
| 4GB[2] | - | - | - | 4 |

This table does not represent all possible memory configurations. Memory modules may vary in price per MB. Selection of smaller RDIMMs may provide a more cost-effective alternative to using larger RDIMMs. RDIMMs must be added in pairs to support interleaving technology,
1. Network operating systems may limit the maximum amount of addressable memory. See operating system specifications for further information.
2. Requires removal of standard memory.

## xSeries 232 Hard Disk Drive (HDD) Storage

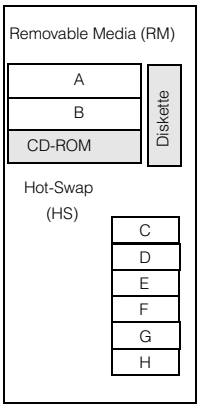
| Total Int Storage[1] | 7200RPM HDDs | | | 10,000RPM HDDs | | | | 15,000RPM HDDs | |
|---|---|---|---|---|---|---|---|---|---|
| | 9.1GB 37L7201 | 18.2GB 37L7202 | 36.4GB 37L7203 | 9.1GB 37L7204 | 18.2GB 37L7205 | 36.4GB 37L7206 | 73.4GB 06P5756 | 9.1GB 19K0655 | 18.2GB 19K0656 |
| 0GB | Standard on base models | | | | | | | | |
| 9.1GB | 1 | - | - | 1 | - | - | - | 1 | - |
| 18.2GB | 2 | 1 | - | 2 | 1 | - | - | 2 | 1 |
| 27.3GB | 3 | - | - | 3 | - | - | - | 3 | - |
| 36.4GB | 4 | 2 | 1 | 4 | 2 | 1 | - | 4 | 2 |
| 45.5GB | 5 | - | - | 5 | - | - | - | 5 | - |
| 54.6GB | 6 | 3 | - | 6 | 3 | - | - | 6 | 3 |
| 72.8GB | - | 4 | 2 | - | 4 | 2 | - | - | 4 |
| 91GB | - | 5 | - | - | 5 | - | - | - | 5 |
| 109.2GB | - | 6 | 3 | - | 6 | 3 | - | - | 6 |
| 145.6GB | - | - | 4 | - | - | 4 | - | - | - |
| 182GB | - | - | 5 | - | - | 5 | - | - | - |
| 218.4GB | - | - | 6 | - | - | 6 | - | - | - |
| 327.6GB[2] | - | - | 9 | - | - | 9 | - | - | - |
| 440.4GB | - | - | - | - | - | - | 6 | - | - |
| 660.6GB[3] | - | - | - | - | - | - | 9 | - | - |

This table does not represent all possible HDD configurations.
1. Select a total storage row then select the quantity of HDDs from a column corresponding to the HDD of choice. Total Internal Storage listed is within +/- 0.2GB unless otherwise noted.
2. Internal storage using 36.4GB HDD can be increased to 327.6GB by converting the two available removable bays to three hot-swap HDD bays using an optional 3-Pack Ultra160 Hot-Swap Expansion Kit (P/N 33L5050).
3. Maximum internal storage using 73.4GB HDD can be increased to 660.6GB by converting the two available removable media bays to three hot-swap HDD bays using an optional 3-Pack Ultra160 Hot-Swap Expansion Kit (P/N 33L5050).

| Bay | Form Factor | Height | Front Access | Usage |
|---|---|---|---|---|
| A[1] | 133mm (5.25in) | HH[2] | Yes | Open |
| B[1] | 133mm (5.25in) | HH[2] | Yes | Open |
| - | 133mm (5.25in) | HH | Yes | IDE CD-ROM |
| - | 89mm (3.5in) | SL | Yes | Diskette |
| C … H[3] | HS | SL | Yes | Open |

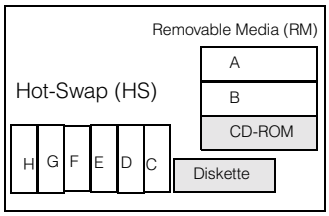
1. Bays A and B can be converted to three hot-swap HDDs using the optional 3-Pack Ultra160 Hot-Swap Expansion Kit (P/N 33L5050).
2. Two half-high (HH) bays cannot be combined to support a single full-high (FH) device.
3. Half-high devices are not supported.

Tower Model View




For clarity purposes, bay labels in these diagrams are for reference by the accompanying tables and are not the actual labels. Refer to the documentation shipped with the system for further details on actual labels.

Rack Model View




| Part Number | Description | RPM | Height | Bays Supported | Max Qty[1] |
|---|---|---|---|---|---|
| **Hot-Swap Ultra160 HDDs** | | | | | |
| 37L7201 | 9.1GB Ultra160 SCSI Hot-Swap SL HDD | 7200 | SL | C … H | 6 |
| 37L7202 | 18.2GB Ultra160 SCSI Hot-Swap SL HDD | 7200 | SL | C … H | 6 |
| 37L7203 | 36.4GB Ultra160 SCSI Hot-Swap SL HDD | 7200 | SL | C … H | 6 |
| 37L7204 | 9.1GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD | 10000 | SL | C … H | 6 |
| 37L7205 | 18.2GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD | 10000 | SL | C … H | 6 |
| 37L7206 | 36.4GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD | 10000 | SL | C … H | 6 |
| 19K0655 | 9.1GB 15Krpm Ultra160 SCSI Hot-Swap HDD | 15000 | SL | C … H | 6 |
| 19K0656 | 18.2GB 15Krpm Ultra160 SCSI Hot-Swap HDD | 15000 | SL | C … H | 6 |
| 06P5756 | 73.4GB 10Krpm Ultra160 SCSI Hot-Swap SL HDD | 10000 | SL | C … H | 6 |

| Part Number | Description | |
|---|---|---|
| **Associated Options** | | |
| 33L3760 | 250W Hot-Swap Redundant Power Supply | - |
| 24P3513 | xSeries Hot-Swap Power Conversion Kit[2] | - |
| 33L5050 | IBM 3-Pack Ultra160 Hot-Swap Expansion Kit[3] | - |
| **Optical Devices** | | |
| 10K3785 | 12X-8X-32X Black Internal CD-RW Drive[4] | - |
| **External Storage Expansion Units[5]** | | **Form Factor** |
| 35311RU | EXP300 Storage Expansion Unit[6] | Rack (3U) |
| 09N7296 | EXP300 Rack-to-Tower Conversion Kit | - |
| 35601RU | FAStT EXP500 Storage Expansion Unit[7] | Rack (3U) |
| 35421RU | FAStT200 Storage Server[8, 9] | Rack (3U) |
| 35422RU | FAStT200 HA Storage Server[8] | Rack (3U) |
| 19K1121 | FAStT200 Redundant RAID Controller | - |

1. Maximum quantity of HDDs can be increased to nine by converting the two removable media bays to three SL HDD bays using the 3-Pack Ultra160 Hot-Swap Expansion Kit (P/N 33L5050).
2. xSeries Hot-Swap Power Conversion Kit (24P3513) contains a hot-swap power backplane that supports installation for up to three 250W hot-swap power supplies.
3. Bays A and B can be converted to three hot-swap bays using the optional 3-Pack Ultra160 Hot-Swap Expansion Kit (P/N 33L5050).
4. Either replace standard CD-ROM or install in one of the media bays. An IDE cable with three connectors is included with the optional DVD-ROM. If installing as an additional device, connect the cable to each optical device and the IDE connector on the system board. Configure the optional device as a master using the preset configuration if replacing the standard device or as a slave if installed as a redundant device.
5. To configure a SCSI storage device, select an optional SCSI controller then refer to Appendix D: Cables - Storage Units - Controllers to confirm the controller supports the desired External Storage Expansion Unit and to select a supported cable. For HDD or other expansion unit options, see the specific expansion unit section. For Fibre Channel storage devices, refer to the Fibre Array Solutions section.
6. EXP300 includes a single 2M Ultra2 SCSI cable and dual hot-swap 500W redundant power supplies, each with its own power cord.
7. FAStT EXP500 Storage Expansion Unit (P/N 35601RU) includes dual hot-swap 350W power supplies, each with its own power cord.
8. The FAStT200 includes two hot-swap, 350W auto-ranging redundant power supplies, each with its own power cord.
9. Can be upgraded to FAStT200 HA Storage Server through the addition of a FAStT200 Redundant RAID Controller (P/N 19K1121).

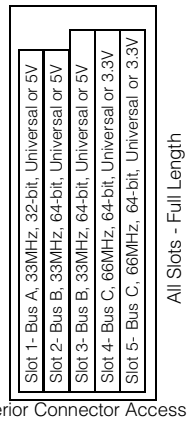
## xSeries 232 Internal SCSI Cabling

The xSeries 232 contains 10 drive bays. The six 3.5in hot-swap bays are located on the lower half of the xSeries 232 tower models or on the left side of the rack models. These bays support various hot-swap drive options. There are four bays on the top portion of tower models or the right side of rack models, which are primarily designed for removable media devices. One bay contains the standard 3.5in SL diskette drive and another bay contains the standard CD-ROM drive. The remaining two 5.25in/3.5in half-high bays can support tape back-up or other devices. Using an optional 3-Pack Ultra160 Hot-Swap Expansion Kit, these two bays can support three 3.5in SL hot-swap HDDs.

The xSeries 232 contains a backplane supporting six hot-swap drive bays.The backplane is connected to the integrated dual-channel, Ultra160 SCSI controller connector through a 16-bit LVD SCSI cable. If internal RAID support is required, this cable can be used to connect to a supported RAID adapter rather than the integrated SCSI controller. A two-drop, 16-bit SCSI cable with integrated terminator is included with the Media Bay Tray and LVD Cable Kit. The two-drop cable supports up to two internal devices in the open 5.25in/3.5in device bays. This cable can be attached to the integrated Ultra160 SCSI controller connector if a RAID adapter is used to support the internal hot-swap drive bays. It can also be used to attach to a supported SCSI adapter if the integrated Ultra160 SCSI controller is utilized for the hot-swap bays. The 48x-20x IDE CD-ROM is cabled directly to the IDE port. To attach external SCSI devices, a supported SCSI adapter is required.

## xSeries 232 I/O Options

| Part Number | Description | Adapter Length | PCI Support[1] | Slots Supported[1] |
|---|---|---|---|---|
| | **Storage Controllers[2]** | | | |
| 37L6091 | ServeRAID-4L Ultra160 SCSI Controller[3] | Full | 64-bit | 1 … 5 |
| 37L6080 | ServeRAID-4M Ultra160 SCSI Controller[4] | Full | 64-bit | 2 … 5 |
| 37L6889 | ServeRAID-4H Ultra160 SCSI Controller[5] | Full | 64-bit | 2 … 5 |
| 06P5736 | ServeRAID-4Mx Ultra160 SCSI Controller[6] | Full | 64-bit | 2 … 5 |
| 06P5740 | ServeRAID-4Lx Ultra160 SCSI Controller[7] | Half | 64-bit | 1 … 5 |
| 19K4646 | PCI Wide Ultra160 SCSI Adapter[8] | Half | 64-bit | 1 … 5 |
| 02K3454 | PCI Fast/Wide Ultra SCSI Adapter[18] | Half | 32-bit | 1 … 5 |
| | **Fibre Storage Controllers and Options[9]** | | | |
| 00N6881 | Netfinity FAStT Host Adapter | Half | 64-bit | 1 …5 |
| 35521RU | FAStT500 Storage Server | - | - | - |
| 35421RU | FAStT200 Storage Server | - | - | - |
| 35422RU | FAStT200 HA Storage Server | - | - | - |
| 35341RU | SAN Fibre Channel Managed Hub | - | - | - |
| 2109S08 | SAN Fibre Channel Switch, 8-Port | - | - | - |
| 2109S16 | SAN Fibre Channel Switch, 16-Port | - | - | - |
| 2108R3L | SAN Data Gateway Router Ultra SCSI LVD Port[10] | - | - | - |
| | **Networking[11]** | | | |
| | **Ethernet[12, 13]** | | | |
| 19K4401 | Netfinity Gigabit Ethernet Adapter (copper) | Half | 64-bit | 1 … 5 |
| 06P3601 | 10/100 Ethernet Server Adapter | Half | 32-bit | 1 … 5 |
| 06P3701 | Gigabit Ethernet SX Server Adapter (fiber) | Half | 64-bit | 1 … 5 |
| 09N9901 | 10/100 EtherLink Server Adapter by 3Com | Half | 32-bit | 1 … 5 |
| 22P4901 | 10/100 Dual Port Server Adapter | Half | 64-bit | 1 … 5 |
| | **Token Ring[13]** | | | |
| 34L5201 | High-Speed 100/16/4 Token-Ring PCI Management Adapter | Half | 32-bit | 1 … 5 |
| 34L5001 | 16/4 Token-Ring PCI Management Adapter | Half | 32-bit | 1 … 5 |
| | **Communications[14]** | | | |
| 33L4618 | V.90 PCI Data/Fax Modem[15] | Half | 32-bit | 1 … 5 |
| | **Systems Management** | | | |
| 09N7585 | Remote Supervisor Adapter | Half | 32-bit | 1 |
| | **Host Attach** | | | |
| 9086001 | Netfinity ESCON Adapter[16] | Full | 32-bit | 1 … 5[17] |


Slot 1- Bus A, 33MHz, 32-bit, Universal or 5V
Slot 2- Bus B, 33MHz, 64-bit, Universal or 5V
Slot 3- Bus B, 33MHz, 64-bit, Universal or 5V
Slot 4- Bus C, 66MHz, 64-bit, Universal or 3.3V
Slot 5- Bus C, 66MHz, 64-bit, Universal or 3.3V
All Slots - Full Length
Exterior Connector Access

1. A 64-bit adapter installed into a 32-bit slot will transfer data at 32-bit rates. Adapters rated at 66MHz will operate at 33MHz when installed in a 33MHz slot. 33MHz adapters will reduce 66MHz buses to 33MHz.
2.xSeries 232 includes a dual-port, dual-channel Ultra160 SCSI controller for internal use only. No standard external port is available. See "Internal SCSI Cabling" for cabling alternatives.
3. ServeRAID-4L Ultra160 SCSI Controller is powered by a 100MHz Intel i960 processor and provides a single channel, 16MB of ECC cache and either one internal or one external Ultra160 connection. External connector is 0.8mm VHDCI.
4. ServeRAID-4M Ultra160 SCSI Controller is powered by a 100MHz Intel i960 processor and provides two channels, 64MB of battery-backed ECC cache and two internal and two external Ultra160 connectors (only two connectors may be utilized). External connectors are 0.8mm VHDCI .
5. ServeRAID-4H Ultra160 SCSI Controller is powered by a 266MHz PowerPC 750 processor and provides 128MB of battery-backed ECC cache. Four external Ultra160 0.8mm VHDCI connectors are available.
6. ServeRAID-4Mx Ultra160 SCSI Controller is powered by a 100MHz Intel Zion GC80303 processor that provides 64MB of battery-backed ECC cache and two internal and two external Ultra160 connections (only two connectors may be used). External connections are 0.8mm VHDCI.
7. ServeRAID-4Lx Ultra160 SCSI Controller is powered by a 100MHz Intel Zion GC80303 processor and provides a single channel, 32MB of ECC cache and either one internal or one external Ultra160 connection. External connector is 0.8mm VHDCI.
8. PCI Wide Ultra160 SCSI Adapter (P/N 19K4646) provides a single channel with one internal connector, a five-drop multi-mode terminated LVD SCSI cable and one external 0.8mm VHDCI connector. Only one of the two connectors may be utilized.

9. See Fibre Array Solutions section for additional configuration information.
10. The 2108R3L SAN Data Gateway Router Ultra SCSI LVD port provides one integrated short-wave optical port and two SCSI ports for tape storage connections (LVD, HVD and single-ended).
11. xSeries 232 includes a full-duplex, 10/100Mbps Ethernet PCI controller.
12. In a fault-tolerant networking environment, using the fault-tolerant software delivered with the Ethernet adapters of a single manufacturer is recommended. Installing fault-tolerant solutions provided by multiple manufacturers may cause failures if the intermediate drivers provided with the adapters are not compatible.The onboard Ethernet is Intel-based, which is compatible with the three Intel-based optional Ethernet adapters (P/N 06P3601, 06P3701, 22P4901).
13. This server supports Wake on LAN and Alert-on-LAN functions through the integrated Ethernet controller only. These functions are not supported for optional PCI adapters.
14. xSeries 232 includes two USB ports and two serial ports.
15. Due to homologation variances, modem availability may differ by country.
16. Provides an ESCON MIC and a DB9 Serial Port. Cables are not included but are available through S/390 channels. Contact your IBM representative for additional information.
17. A maximum of two 9086001 adapters (installed in nonadjacent slots) are supported in a single server.
18. PCI Fast/Wide Ultra SCSI Adapter (P/N 02K3454) provides one external 68-pin high density connector that supports external SCSI devices such as tape enclosures.

## xSeries 232 Power, Monitors & Accessories

| Part Number | Description |
|---|---|
| | **Power[1]** |
| 33L3760 | 250W Hot-Swap Redundant Power Supply[2] |
| 24P3513 | xSeries Hot-Swap Power Conversion Kit[3] |
| | **Uninterruptible Power Supply (UPS)[4]** |
| 94G3134 | APC Smart-UPS 700 |
| 94G3135 | APC Smart-UPS 1000 |
| 94G3136 | APC Smart-UPS 1400 |
| 94G6674 | APC Smart-UPS 1400RMB[5] |
| 94G6676 | APC Smart-UPS 3000RMB[5] |
| 37L6861 | APC Smart-UPS 5000RMB[6] |
| | **Monitors[7]** |
| 633347N | E51 Color Monitor 15in (350mm, 13.8in Viewable Image Size), stealth black[8] |
| 6331N2N | E54 Color Monitor 15in (350mm, 13.8in Viewable Image Size), stealth black[8] |
| 6332J1N | E74 Color Monitor 17in (403mm, 15.9in Viewable Image Size), stealth black[8] |
| 66274AN | G78 Color Monitor 17in (406.4mm, 16in Viewable Image Size), stealth black[8] |
| 9511AG4 | T540 Flat Panel Color Monitor 15in (381mm, 15in viewable image), stealth black[9] |

1. xSeries 232 models 11X, 1RX, 21X and 2RX include a single 385W power supply and a single 9ft 110V power cord with an IEC 320-C13 connector on the system end and NEMA 5-15P on the other end. Power supply redundancy may be achieved by removing the standard power supply and installing two or three optional 250W Hot-Swap Redundant Supplies (P/N 33L3760). xSeries Hot-Swap Power Conversion Kit (P/N 24P3513) is required when optional power supplies are added to base models. Models shipped standard with power redundancy are equipped with two hot-swap 250W power supplies. A third hot-swap 250W power supply may be added for robust configurations. The hot-swap power supply backplane is included in redundant models. To assist in determining when an additional power supply is required to preserve redundancy, a "Non-Redundant LED" is a standard feature.
2. 250W Hot-Swap Redundant Power Supply (P/N 33L3760) includes a single 6ft power cord for connection to a low voltage wall outlet. xSeries Hot-Swap Power Supply Conversion Kit (P/N 24P3513) must be installed prior to adding optional power supplies in base models, which include a single 385W power supply.
3. xSeries Hot-Swap Power Supply Conversion Kit (P/N 24P3513) includes a hot-swap power backplane. Use when installing additional power supplies in base models (removal of standard power supply required).
4. For runtimes and UPS attributes see Appendix C: UPS Runtime Estimate.
5. Height is 3U. See Rack Cabinets and Options section for supported IBM racks.
6. Height is 5U. See Rack Cabinets and Options section for supported IBM racks.
7. xSeries 232 uses an SVGA controller (S3 Savage4 chipset) with 8MB of video memory.
8. Installation within a rack requires optional Monitor Compartment (P/N 94G7444).
9. Installation within a rack requires optional Netfinity Flat Panel Monitor Rack Mount Kit II (P/N 37L6888) and Netfinity Rack Keyboard Tray (P/N 28L4707). A space saver keyboard may coexist within the same 28L4707 keyboard tray.

| Part Number | Description |
|---|---|
| | **Conversion Kits** |
| 21P9593 | 5Ux24D Tower-to-Rack Kit II |
| | **Rack and NetBAY[1]** |
| | Refer to the Rack Cabinets and Options section for information concerning IBM racks and rack-supported devices. |
| | **Keyboard and Mouse[2]** |
| 28L3644 | Space Saver II Keyboard[3, 5] |
| 01K1260 | TrackPoint IV 104-Key Black Keyboard[4, 5] |
| 28L3621 | Preferred Keyboard (stealth black)[4] |
| 10K3849 | 106-key Preferred USB Keyboard with 2-port USB Hub (stealth black)[4] |
| 22P5150 | TrackPoint USB Space Saver Keyboard[3, 5] |
| 28L3673 | Sleek 2-Button Stealth Black Mouse |
| 33L3244 | Sleek USB Mouse (stealth black) |

1. xSeries 232 rack models are housed in a 19in rack-mountable drawer and require one of the racks listed in the Rack Cabinets and Options section.
2. Tower models include both a keyboard and mouse. Rack models include neither.
3. Installation within a rack requires optional keyboard tray (P/N 28L4707), which stows in ready-to-use position.
4. Installation within a rack requires optional keyboard tray (P/N 28L4707). This keyboard cannot share a keyboard tray with a flat panel display.
5. Advanced TrackPoint IV features are not available on IBM xSeries or Netfinity systems.

## xSeries 232 Tape Options

| Part Number | Tape Drives | Bays Supported | SCSI Interface (bit) | Form Factor | Termination Included | 68/50-pin Converter Incl | Ext Tape Enclosures |
|---|---|---|---|---|---|---|---|
| 00N7991 | 20/40GB DDS/4 4mm Internal Tape Drive[1] | A, B | 16 Ultra2 LVD | 89mm (3.5in) HH or 133mm (5.25in) HH | N | - | 3510020[3], 3551001[2] |
| 09N4040 | 20/40GB DLT Internal SCSI Tape Drive[1] | A+B | 8 | 133mm (5.25in) FH | N | Y | 3551001[3] |
| 00N7990 | 40/80GB DLT Internal SCSI Tape Drive[1] | A+B | 16 Ultra2 LVD | 133mm (5.25in) FH | N | - | 3551001[2] |
| 00N8015 | 110/220GB Super DLT Internal SCSI Tape Drive[1] | A+B | 16 Ultra2 LVD | 133mm (5.25in) FH | N | - | 3551001[2] |
| 00N8016 | 100/200GB LTO Tape Drive[1] | A+B | 16 Ultra2 LVD | 133mm (5.25in) FH | N | - | 3551001[2] |
| 00N8017 | 60/120GB 8mm M2 SCSI Tape Drive[1] | A, B | 16 Ultra2 LVD | 133mm (5.25in) HH | N | - | 3510020[3] 3551001[2] |
| 24P2396 | 100/200GB LTO Half-High Tape Drive[1] | A, B | 16 Ultra2 LVD | 133mm (5.25in) HH | N | - | 3551001[2] |
| | **Tape Autoloaders** | | | | | | |
| 00N7992 | 120/240GB DDS/4 Tape Autoloader[1] | A+B | 16 Ultra2 LVD | 133mm (5.25in) FH | N | - | 3551001[2] |
| 3502108 | DLT Tape Autoloader | - | 16 | Desktop | Y | - | - |
| | **External Tape Libraries[4]** | | | | | | |
| 3502x14 | DLT Tape Library | - | 16 | Desktop or Rack | Y | - | - |
| | **External Tape Enclosures** | | | | | | |
| 3510020 | External Half-High SCSI Storage Enclosure[5] | - | 8, 16 | Desktop | N | N | - |
| 3551001 | NetMEDIA Storage Expansion Unit EL[6] | - | 16 | Rack | Y | N | - |
| 10L7113 | NetMEDIA Systems Management Adapter[7] | - | 16 LVD | - | N | N | 3551001 |
| | **Associated Options** | | | | | | |
| 10K2340 | Media BayTray and LVD Cable Kit[1, 2] | - | 16 LVD | Int | Y | N | 3551001 |
| 00N7956 | 68-pin External Multimode LVD/SE SCSI Terminator | - | 16 LVD/SE | Ext | Y | N | 3510020 |
| 24P3513 | xSeries Hot-Swap Power Conversion Kit[8] | - | - | - | - | - | - |
| 33L3760 | 250W Hot-Swap Redundant Power Supply | - | - | - | - | - | - |

Note: Additional power is not required when installing a SCSI device in bay A or B. If adding additional power supplies to base models for redundancy, removal of the standard 385W power supply is required before adding both Hot-Swap Power Conversion Kit (P/N 24P3513) and two or three optional 250W Hot-Swap Redundant Power Supplies (P/N 33L3760). Models shipped standard with redundant power contain two hot-swap 250W power supplies (maximum of three). An optional SCSI cable is required for attachment of media bay devices to the Ultra160 controller B. No external SCSI port is available. External tape enclosures are supported by PCI Wide Ultra160 SCSI Adapter (P/N 19K4646) which has an external 0.8mm VHDCI connector.

1. Internal tape drives require the two-drop multi-mode terminated LVD SCSI cable included with the Media Bay Tray and LVD Cable Kit (P/N 10K2340).
2. LVD support for LVD devices installed in a NetMEDIA Storage Expansion Unit EL (P/N 3551001) requires replacement of the standard single-ended internal cables with one or more (depending on configuration) cables from Media Bay Tray and LVD Cable Kit (P/N 10K2340) which contains a single two-drop multi-mode terminated cable. If the standard cables are used for attachment to LVD devices, single-ended SCSI rules and bus speeds apply.
3. Requires 68-pin External Multimode LVD/SE SCSI terminator (P/N 00N7956).
4. Tape library attributes and prerequisites are located in Appendix B: Tape Library Attributes.
5. Provides a black desktop 133mm (5.25in) half-high (HH) tape enclosure. Connector is configurable as 50-pin Centronix or 68-pin high density. Requires either tape drive self-termination or 68-pin External Multimode LVD/SE SCSI Terminator (P/N 00N7956).
6. NetMEDIA Storage Expansion Unit EL (P/N 3551001) is a black 3U, 19in rack mountable tape enclosure which includes two full-high (FH) or four half-high (HH) extended length 133mm (5.25in) bays, two external 0.8mm VHDCI connectors and two internal four-drop single-ended terminated 16-bit SCSI cables for device attachment. Two power supplies and two power cords are also included. Tip: The front rail clips will need to be reversed and screwed in from behind to secure the unit in a 930842x rack.
7. NetMEDIA Systems Management Adapter (P/N 10L7113) may be installed in a 3551001 to provide repeater function, LVDS interface, aggregate cable lengths up to 12m when attached to an LVD SCSI controller, and auto-termination when the 3551001 is powered off. External connector is 0.8mm VHDCI.
8. IBM eServer xSeries Hot-Swap Power Conversion Kit (P/N 24P3513) includes a hot-swap power backplane. Required when upgrading standard power on base models (11X, 1RX, 21X and 2RX), which are shipped with a single 385W power supply that must be removed when adding this option.

Note: Additional tape attributes can be found in Appendix A: Tape Drive Attributes.

# IBM xSeries 240 and Netfinity 5600

| Part Number | Processor Speed (MHz)[2] | Number of Processors (Std/Max) | L2 ECC Cache (KB) | Memory (Std/Max) (R = RDIMM) | Form Factor | Power Supply Quantity (Std/Max) | Hot-Swap (Power, Slots, HDD, Fans) | Redundancy (Optional, Standard) | Adv System Management Processor | Onboard Ethernet (Mbps) | SCSI Controller (Dual, Ultra, RAID) | Removable Media Bays (Total/Avail) | Internal Hard Disk Drive (Std/Max) | CD-ROM (IDE) | Bays (Total/Avail) | Slots (Total/Avail) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **xSeries 240 / Netfinity 5600 At-A-Glance** | | | | | | | | | | | | | | | | |
| 8664-71Y | 933 | 1/2 | 256 | 256MB(R)/4GB[3] | Tower | 2/3 | P, S,H,F | S-Power[4] S-Fans | Y | 10/100 | D,U2 | 4/2 | 0/ 440.6GB | 40X-17X[5] | 10/8 | 5/5 |
| 8664-7RY[1] | 933 | 1/2 | 256 | 256MB(R)/4GB[3] | Rack (5U) | 2/3 | P, S,H,F | S-Power[4] S-Fans | Y | 10/100 | D,U2 | 4/2 | 0/ 440.6GB | 40X-17X[5] | 10/8 | 5/5 |
| 8664-81Y[6] | 1GHz | 1/2 | 256 | 256MB(R)/4GB[3] | Tower | 2/3 | P, S,H,F | S-Power[4] S-Fans | Y | 10/100 | D,U2 | 4/2 | 0/ 440.6GB | 40X-17X[5] | 10/8 | 5/5 |
| 8664-8RY[1, 6] | 1GHz | 1/2 | 256 | 256MB(R)/4GB[3] | Rack (5U) | 2/3 | P, S,H,F | S-Power[4] S-Fans | Y | 10/100 | D,U2 | 4/2 | 0/ 440.6GB | 40X-17X[5] | 10/8 | 5/5 |

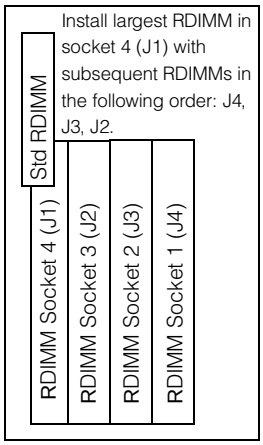
1. Housed in a 19in rack-mountable drawer and ships standard without a keyboard or mouse. See Rack Cabinets and Options section for supported IBM racks.
2. Intel Pentium III processor with advanced transfer L2 cache and 133MHz FSB.
3. High-speed 133MHz SDRAM.
4. Robust configurations may require optional 250W Hot-Swap Redundant Power Supply (P/N 33L3760) for redundancy. See "Power" under "Power, Monitor & Accessories" for additional information.
5. Variable read rate. Actual playback speed will vary and is often less than the maximum possible.
6. This model is an IBM xSeries 240.

**xSeries 240 / Netfinity 5600 Processors**

| Part Number | Processor Upgrades | SMP Support[1] | Processor Speed Upgrade[2] |
|---|---|---|---|
| 19K4631 | Netfinity 933MHz 133MHz FSB/256KB Upgrade with Pentium III Processor | 7xY | - |
| 19K4640 | 1GHz Upgrade with 133MHz FSB and 256KB Advanced Transfer Cache Pentium III Processor | 8xY | 7xY |

1. One additional processor may be installed, providing a maximum of two. All processors must be identical in type, speed, and cache size.
2. Requires removal of the standard processor. A maximum of two processors may be installed. All processors must be identical in type, speed and cache size. Upgrades may require a BIOS update. To obtain the latest Flash BIOS, access www.pc.ibm.com/support and enter machine "Type-Model" in Quick Path. Select "Downloadable files" and then "BIOS".

## xSeries 240 / Netfinity 5600 Memory


Install largest RDIMM in socket 4 (J1) with subsequent RDIMMs in the following order: J4, J3, J2.
Std RDIMM
RDIMM Socket 4 (J1)
RDIMM Socket 3 (J2)
RDIMM Socket 2 (J3)
RDIMM Socket 1 (J4)

| Total Memory[1] | Quantity of RDIMMs Added | | | |
|---|---|---|---|---|
| **256MB (1 x 256) Models** | **128MB (33L3058)** | **256MB (33L3060)** | **512MB (33L3062)** | **1GB (33L3064)** |
| 384MB | 1 | - | - | - |
| 512MB | 2 or | 1 | - | - |
| 640MB | 3 | - | - | - |
| 768MB | - | 2 or | 1 | - |
| 1024MB | - | 3 | - | - |
| 1280MB | - | - | 2 or | 1 |
| 1792MB | - | - | 3 | - |
| 2048MB | - | - | 4[2] | - |
| 2304MB | - | - | - | 2 |
| 3328MB | - | - | - | 3 |
| 4096MB (max) | - | - | - | 4[2] |

This table does not represent all possible memory configurations.
1. Network operating systems may limit the maximum amount of addressable memory. See operating system specifications for further information.
2. Requires removal of standard memory.

| Part Number | Memory Description[1] |
|---|---|
| 33L3058 | 128MB, 133MHz SDRAM ECC RDIMM |
| 33L3060 | 256MB, 133MHz SDRAM ECC RDIMM |
| 33L3062 | 512MB, 133MHz SDRAM ECC RDIMM |
| 33L3064 | 1GB, 133MHz SDRAM ECC RDIMM |

1. Install largest RDIMM in socket 4 (J1) with subsequent RDIMMs in the following order: J4, J3, J2.

## xSeries 240 / Netfinity 5600 Hard Disk Drive (HDD) and External Storage

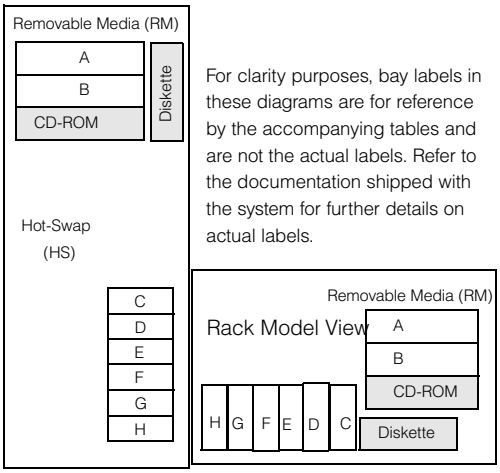
| Total Int Storage[1] | 7200RPM HDDs | | | 10,000RPM HDDs | | | | 15,000RPM HDDs | |
|---|---|---|---|---|---|---|---|---|---|
| | **9.1GB 37L7201[2]** | **18.2GB 37L7202[2]** | **36.4GB 37L7203[2]** | **9.1GB 37L7204[2]** | **18.2GB 37L7205[2]** | **36.4GB 37L7206[2]** | **73.4GB 06P5756[2]** | **9.1GB 19K0655[2]** | **18.2GB 19K0656[2]** |
| 0GB | Standard on base models | | | | | | | | |
| 9.1GB | 1 | - | - | 1 | - | - | - | 1 | - |
| 18.2GB | 2 | 1 | - | 2 | 1 | - | - | 2 | 1 |
| 27.3GB | 3 | - | - | 3 | - | - | - | 3 | - |
| 36.4GB | 4 | 2 | 1 | 4 | 2 | 1 | - | 4 | 2 |
| 45.5GB | 5 | - | - | 5 | - | - | - | 5 | - |
| 54.6GB | 6 | 3 | - | 6 | 3 | - | - | 6 | 3 |
| 72.8GB | - | 4 | 2 | - | 4 | 2 | - | - | 4 |
| 91GB | - | 5 | - | - | 5 | - | - | - | 5 |
| 109.2GB | - | 6 | 3 | - | 6 | 3 | - | - | 6 |
| 145.6GB | - | - | 4 | - | - | 4 | - | - | - |
| 182GB | - | - | 5 | - | - | 5 | - | - | - |
| 218.4GB | - | - | 6 | - | - | 6 | - | - | - |
| 220.2GB | - | - | - | - | - | - | 3 | - | - |
| 293.6GB | - | - | - | - | - | - | 4 | - | - |
| 367GB | - | - | - | - | - | - | 5 | - | - |
| 440.4GB (max) | - | - | - | - | - | - | 6 | - | - |

This table does not represent all possible HDD configurations.
1. Select a total storage row then add the quantity of HDDs from all columns in an RPM range.Total Internal Storage listed is within +/- 0.2GB unless otherwise noted.
2. xSeries 240 / Netfinity 5600 contains an Ultra2 hot-swap backplane which limits Ultra160 HDDs to Ultra2 bus speeds.

| Bay | Form Factor | Height | Front Access | Usage |
|---|---|---|---|---|
| A | 133mm (5.25in) | HH[1] | Yes | Open |
| B | 133mm (5.25in) | HH[1] | Yes | Open |
| - | 133mm (5.25in) | HH | Yes | IDE CD-ROM |
| - | 89mm (3.5in) | SL | Yes | Diskette |
| C … H | HS | SL[2] | Yes | Open |

1. Two half-high (HH) bays can be combined to support a single full-high (FH) device
2. Two slim-line (SL) bays can be combined to support a single half-high (HH) device.

Tower Model




For clarity purposes, bay labels in these diagrams are for reference by the accompanying tables and are not the actual labels. Refer to the documentation shipped with the system for further details on actual labels.

| P / N | Description | RPM | Height | Bays Supported | Max Qty |
|---|---|---|---|---|---|
| **Ultra160 Hard Disk Drives (HDD)[1]** | | | | | |
| 37L7201 | 9.1GB Ultra160 SCSI Hot-Swap SL HDD | 7200 | SL | C … H | 6 |
| 37L7202 | 18.2GB Ultra160 SCSI Hot-Swap SL HDD | 7200 | SL | C … H | 6 |
| 37L7203 | 36.4GB Ultra160 SCSI Hot-Swap SL HDD | 7200 | SL | C … H | 6 |
| 37L7204 | 9.1GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD | 10000 | SL | C … H | 6 |
| 37L7205 | 18.2GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD | 10000 | SL | C … H | 6 |
| 37L7206 | 36.4GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD | 10000 | SL | C … H | 6 |
| 19K0655 | 9.1GB 15Krpm Ultra160 SCSI Hot-Swap HDD | 15000 | SL | C … H | 6 |
| 19K0656 | 18.2GB 15Krpm Ultra160 SCSI Hot-Swap HDD | 15000 | SL | C … H | 6 |
| 06P5756 | 73.4GB 10Krpm Ultra160 SCSI Hot-Swap SL HDD | 10000 | SL | C … H | 6 |
| **Associated Options** | | | | | |
| 10K2340 | Media Bay Tray and LVD Cable Kit[2] | - | - | A+B | 1 |
| | **Ext Storage Expansion Units[3]** | **Form Factor** | | | |
| 35311RU | EXP300 Storage Expansion Unit[4] | Rack (3U) | | | |
| 09N7296 | EXP300 Rack-to-Tower Conversion Kit | - | | | |
| 35601RU | FAStT EXP500 Storage Expansion Unit[5] | Rack (3U) | | | |
| 35421RU | FAStT200 Storage Server[6, 7] | Rack (3U) | | | |
| 35422RU | FAStT200 HA Storage Server[6] | Rack (3U) | | | |
| 19K1121 | FAStT200 Redundant RAID Controller | - | | | |

1. xSeries 240 / Netfinity 5600 contains an Ultra2 hot-swap backplane which limits Ultra160 HDDs to Ultra2 bus speeds.
2. Media Bay Tray and LVD Cable Kit (P/N 10K2340) contains a two-drop terminated LVD SCSI cable and the hardware required to convert two half-high 5.25in removable media bays into two nonhot-swap 7200RPM HDD bays.
3. Not supported by the onboard external SCSI port. To configure one of the SCSI storage devices listed here, select an optional SCSI controller then refer to Appendix D: Cables - Storage Units - Controllers to confirm that the controller supports the desired External Storage Expansion Unit and to select a supported cable. For HDD or other expansion unit options, see the specific expansion unit section. For Fibre Channel storage devices, refer to the Fibre Array Solutions section.
4. EXP300 includes a single 2M Ultra2 SCSI cable and dual hot-swap 500W redundant power supplies, each with its own power cord. To convert an EXP300 to a tower form factor, Netfinity EXP300 Rack-to-Tower Conversion Kit (P/N 09N7296) is required.
5. FAStT EXP500 Storage Expansion Unit (P/N 35601RU) includes dual hot-swap 350W power supplies, each with its own power cord.
6. The FAStT200 includes two hot-swap, 350W auto-ranging redundant power supplies, each with its own power cord.
7. Can be upgraded to FAStT200 HA Storage Server through the addition of a FAStT200 Redundant RAID Controller (P/N 19K1121).

### xSeries 240 / Netfinity 5600 Internal SCSI Cabling

The xSeries 240 and Netfinity 5600 contain a backplane supporting six hot-swap drive bays. The backplane is connected to the integrated dual channel, wide Ultra2 SCSI controller connector through a 16-bit LVD SCSI cable. If internal RAID support is required, this cable can be used to connect to a supported RAID adapter rather than the integrated SCSI controller. A two-drop, 16-bit SCSI cable with integrated terminator is also included with the server to support up to two internal removable media devices. This cable can be attached to the integrated SCSI controller if a RAID adapter is used to support the internal hot-swap drive bays. It can also be used to attach to a supported SCSI adapter if the integrated Ultra2 SCSI controller is utilized for the hot-swap bays. The second channel is available through an industry-standard 0.8mm Very High Density Connector Interface (VHDCI) located on the rear panel for external use.

## xSeries 240 / Netfinity 5600 I/O Options

| Part Number | Description | Adapter Length | PCI Support[24] | Slots Supported[24] | Hot-Plug[2] |
|---|---|---|---|---|---|
| | **Storage Controllers[1]** | | | | |
| 37L6091 | ServeRAID-4L Ultra160 SCSI Controller[3] | Full | 64-bit | 1 … 5 | X |
| 37L6080 | ServeRAID-4M Ultra160 SCSI Controller[4] | Full | 64-bit | 1 … 5 | X |
| 37L6889 | ServeRAID-4H Ultra160 SCSI Controller[5] | Full | 64-bit | 1 … 5 | X |
| 06P5736 | ServeRAID-4Mx Ultra160 SCSI Controller[6] | Full | 64-bit | 1 … 5 | X |
| 06P5740 | ServeRAID-4Lx Ultra160 SCSI Controller[7] | Half | 64-bit | 1 … 5 | X |
| 19K4646 | PCI Wide Ultra160 SCSI Adapter[8] | Half | 64-bit | 1 … 5 | - |
| 02K3454 | PCI Fast/Wide Ultra SCSI Adapter[25] | Half | 32-bit | 1 … 5 | - |
| | **Fibre Storage Controllers and Options[9]** | | | | |
| 00N6881 | Netfinity FAStT Host Adapter | Half | 64-bit | 1 … 5 | X |
| 35521RU | FAStT500 Storage Server | - | - | - | - |
| 35421RU | FAStT200 Storage Server | - | - | - | - |
| 35422RU | FAStT200 HA Storage Server | - | - | - | - |
| 35341RU | SAN Fibre Channel Managed Hub | - | - | - | - |
| 2109S08 | SAN Fibre Channel Switch, 8-Port | - | - | - | - |
| 2109S16 | SAN Fibre Channel Switch, 16-Port | - | - | - | - |
| 2108R3L | SAN Data Gateway Router UltraSCSI LVD Port[10] | - | - | - | - |
| | **Networking[11]** | | | | |
| | **Ethernet[12]** | | | | |
| 09N9901 | 10/100 EtherLink Server Adapter by 3Com[13] | Half | 32-bit | 1 … 5 | X |
| 19K4401 | Netfinity Gigabit Ethernet Adapter (copper) | Half | 64-bit | 1 … 5 | X |
| 06P3601 | 10/100 Ethernet Server Adapter[13] | Half | 32-bit | 1 … 5 | X |
| 06P3701 | Gigabit Ethernet SX Server Adapter (fiber) | Half | 64-bit | 1 … 5 | X |
| | **Token Ring** | | | | |
| 34L5001 | 16/4 Token-Ring PCI Management Adapter[13] | Half | 32-bit | 1 … 5 | X |
| 34L5201 | High-Speed 100/16/4 Token-Ring PCI Management Adapter[13] | Half | 32-bit | 1 … 5 | X |
| 34L0701 | Token-Ring 16/4 PCI Adapter 2 with Wake on LAN[13] | Half | 32-bit | 1 … 5 | X |
| | **Communications[14]** | | | | |
| 33L4618 | V.90 PCI Data/Fax Modem[15] | Half | 32-bit | 1 … 5 | - |
| 37L14xx | Serial I/O SST 8, 16 and 128 Port Adapters[16] | Half | 32-bit | 1 … 5[16] | - |
| | **Systems Management[17]** | | | | |
| 01K7209 | Netfinity Advanced System Management PCI Adapter[18] | Full | 32-bit | 1 … 5[19] | - |
| 03K9309 | Netfinity Advanced System Management Interconnect Cable Kit[20] | - | - | - | - |
| 36L9654 | Netfinity Advanced System Management Token-Rlng Connection[21] | - | - | - | - |
| | **Host Attach** | | | | |
| 9086001 | Netfinity ESCON Adapter[22] | Full | 32-bit | 1 … 5[23] | - |

Rack Model

| Slot 5- PCI, Hot-Plug, 32/64-bit, Full Length | Slot 4- PCI, Hot-Plug, 32/64-bit, Full Length | Slot 3- PCI, Hot-Plug, 32/64-bit, Full Length | Slot 2- PCI, 32-bit, Full Length | Slot 1- PCI, 32-bit, Full Length |
|---|---|---|---|---|

1. xSeries 240 / Netfinity 5600 has two integrated Wide Ultra2 SCSI channels. One is internal and the other is external with a 0.8mm Very High Density Connection Interface (VHDCI).
2. Three of the five PCI slots are 32/64-bit Hot-Plug capable using IBM's Active™ PCI technology. For Network Operating System support, access www.pc.ibm.com/us/compat.
3. ServeRAID-4L Ultra160 SCSI Controller is powered by a 100MHz Intel i960 processor and provides a single channel, 16MB of ECC cache and either one internal or one external Ultra160 connection. External connectors are 0.8mm VHDCI.
4. ServeRAID-4M Ultra160 SCSI Controller is powered by a 100MHz Intel i960 processor and provides two channels, 64MB of battery-backed ECC cache and two internal and two external Ultra160 connectors (only two connectors may be utilized). External connectors are 0.8mm VHDCI.
5. ServeRAID-4H Ultra160 SCSI Controller is powered by a 266MHz PowerPC 750 processor and provides 128MB of battery-backed ECC cache with two internal and up to four external Ultra160 connectors (only four connectors may be utilized). External connectors are 0.8mm VHDCI.
6. ServeRAID-4Mx Ultra160 SCSI Controller is powered by a 100MHz Intel Zion GC80303 processor that provides 64MB of battery-backed ECC cache and two internal and two external Ultra160 connections (only two connectors may be used). External connections are 0.8mm VHDCI.
7. ServeRAID-4Lx Ultra160 SCSI Controller is powered by a 100MHz Intel Zion GC80303 processor and provides a single channel, 32MB of ECC cache and either one internal or one external Ultra160 connection. External connectior is 0.8mm VHDCI.
8. PCI Wide Ultra160 SCSI Adapter (P/N 19K4646) provides a single channel with one internal connector, a five-drop multi-mode terminated LVD SCSI cable and one external 0.8mm VHDCI connector. Only one of the two connectors may be utilized.
9. See Fibre Array Solutions section for additional configuration information.
10. The 2108R3L SAN Data Gateway Router Ultra SCSI LVD port provides one integrated short-wave optical port and two SCSI ports for tape storage connections (LVD, HVD and single-ended).
11. xSeries 240 / Netfinity 5600 has an integrated 10/100 PCI Ethernet Controller.
12. In a fault-tolerant networking environment, using the fault-tolerant software delivered with the Ethernet adapters of a single manufacturer is recommended. Installing fault-tolerant solutions provided by multiple manufacturers may cause failures if the intermediate drivers provided with the adapters are not compatible. The onboard Ethernet is Intel-based, which is compatible with the two Intel-based optional Ethernet adapters (P/N 06P3601, 06P3701).
13. The Wake on LAN function of this option is not supported by this server.
14. xSeries 240 / Netfinity 5600 includes two USB ports, three high-speed serial/asynchronous ports (two NS16550A compatible, one for the Advanced System Management Processor) and one high-speed (up to 2MB/sec data transfer speed) bidirectional parallel port supporting devices using ECP/EPP/SSP protocols adhering to the IEEE1284 standard.
15. Due to homologation variances, modem availability may differ by country.

16. See Appendix E for details on Serial I/O options and configuration limitations. A maximum of four Serial I/O adapters (any combination of P/Ns 37L1414, 37L1415, 37L1416, 37L1423) may be installed.
17. The Netfinity Advanced Systems Management Processor and Interconnect Bus integrated into xSeries 240 / Netfinity 5600 works with Netfinity Director to provide significant system management function. When used with optional Netfinity Advanced System Management PCI Adapter (P/N 01K7209) and Netfinity Advanced System Management Interconnect Cable Kit (P/N 03K9309), additional management and control of up to 12 service processors from a remote console through a single modem or LAN connection is possible.
18. Includes PCI adapter, Netfinity Advanced System Management Interconnect Cable Kit components and 56W AC adapter that requires a separate power source. Provides an integrated 10/100 Ethernet port and PCMCIA slot to support optional Netfinity Advanced System Management Token-Ring Connection (P/N 36L9654).
19. A maximum quantity of one is supported.
20. Required for all xSeries and Netfinity servers containing a standard Advanced System Management Processor that are to be interconnected for system management support through a LAN or modem connection. Optional Netfinity Advanced System Management PCI Adapter (P/N 01K7209) includes the contents of this option. Up to 12 service processors may be interconnected (including standard and optional processors) with an aggregate connection length of no more than 91.4m (300ft). A customer-supplied Ethernet cable is required for each interconnection.
21. Contains an IBM Turbo 16/4 Token-Ring PCI Card, which installs in the PCMCIA card slot of Netfinity Advanced System Management PCI Adapter (P/N 01K7209), and a PC Card to 9-pin D-Shell cable, which is routed to a rear chassis cut-out. The Netfinity Advanced System Management PCI Adapter integrated Ethernet port and Netfinity Advanced System Management Token-Ring Connection cannot be connected or used together.
22. Provides an ESCON MIC and DB9 Serial Port. Cables are not included but are available through S/390 channels. Contact your IBM representative for additional information.
23. A maximum of two 9086001 adapters (installed in nonadjacent slots) are supported in a single server.
24. A 64-bit adapter installed into a 32-bit slot will transfer data at 32-bit rates. Adapters rated at 66MHz will operate at 33MHz when installed in a 33MHz slot. 33MHz adapters will reduce 66MHz buses to 33MHz.
25. PCI Fast/Wide Ultra SCSI Adapter (P/N 02K3454) provides one external 68-pin high density connector that supports external SCSI devices such as tape enclosures.

## xSeries 240 / Netfinity 5600 Power, Monitors & Accessories

| Part Number | Description |
|---|---|
| | **Power[1]** |
| 33L3760 | 250W Hot-Swap Redundant Power Supply |
| | **Uninterruptible Power Supply (UPS)[2]** |
| 94G3135 | APC Smart-UPS 1000 |
| 94G3136 | APC Smart-UPS 1400 |
| 94G6674 | APC Smart-UPS 1400RMB[3] |
| 94G6676 | APC Smart-UPS 3000RMB[3] |
| 37L6861 | APC Smart-UPS 5000RMB[4] |
| | **Monitors[5]** |
| 633347N | E51 Color Monitor 15in (350mm, 13.8in Viewable Image Size), stealth black[6] |
| 6331N2N | E54 Color Monitor 15in (350mm, 13.8in Viewable Image Size), stealth black[6] |
| 6332J1N | E74 Color Monitor 17in (403mm, 15.9in Viewable Image Size), stealth black[6] |
| 66274AN | G78 Color Monitor 17in (406.4mm, 16in Viewable Image Size), stealth black[6] |
| 9511AG4 | T540 Flat Panel Color Monitor 15in (381mm, 15in viewable image), stealth black[7] |

1. xSeries 240 / Netfinity 5600 include two 250W hot-swap power supplies, each with its own power cord. These standard power supplies are sufficient to operate fully configured systems; however, optional 250W Hot-Swap Redundant Power Supply (P/N 33L3760) is required to preserve redundancy if any of the following are exceeded:

**Single Processor Configuration**

- Six SL HDDs and two PCI adapters
  (1 HH HDD = 2 SL, 1 tape = 2 SL, 1 PCI adapter = 2 SL)

E.g., to preserve power supply redundancy with three PCI adapters, only four SL HDDs can be installed before an optional power supply is required.

**Dual Processor Configuration**

- Four SL HDDs and two PCI adapters
  (1 HH HDD = 2 SL, 1 tape = 2 SL, 1 PCI adapter = 2 SL)

A "nonredundant" LED on the system unit will indicate when 250W has been exceeded. 250W Hot-Swap Redundant Power Supply (P/N 33L3760) includes a power cord which requires an additional power source. An independent power source such as a second UPS or second circuit is not required.
2. For runtimes and UPS attributes see Appendix C: UPS Runtime Estimate.
3. Height is 3U. See Rack Cabinets and Options section for supported IBM racks.
4. Height is 5U. See Rack Cabinets and Options section for supported IBM racks.
5. xSeries 240 / Netfinity 5600 use an SVGA controller (S3 Trio 3D chipset) with 4MB of video memory.
6. Installation within a rack requires optional Monitor Compartment (P/N 94G7444).
7. Installation within a rack requires optional Netfinity Flat Panel Monitor Rack Mount Kit II (P/N 37L6888) and Netfinity Rack Keyboard Tray (P/N 28L4707). A space saver keyboard may coexist within the same 28L4707 keyboard tray.

| Part Number | Description |
|---|---|
| **Conversion Kits** | |
| 37L6858 | 5Ux24D Tower-to-Rack Kit |
| **Rack and NetBAY[1]** | |
| | Refer to the Rack Cabinets and Options section for information concerning IBM racks and rack-supported devices. |
| **Keyboard and Mouse[2]** | |
| 28L3644 | Space Saver II Keyboard[3, 5] |
| 01K1260 | TrackPoint IV 104-Key Black Keyboard[4,5] |
| 28L3621 | Preferred Keyboard (stealth black)[4] |
| 28L3673 | Sleek 2-Button Stealth Black Mouse |

1. xSeries 240 / Netfinity 5600 rack models are housed in a 19in rack-mountable drawer and require one of the racks listed in the Rack Cabinets and Options section.
2. Tower models include both a mouse and a keyboard. Rack models include neither.
3. Installation within a rack requires optional keyboard tray ( P/N 28L4707), which stows in ready-to-use position.
4. Installation within a rack requires optional keyboard tray (P/N 28L4707). This keyboard cannot share a keyboard tray with a flat panel display.
5. Advanced TrackPoint IV features are not available on IBM xSeries or Netfinity systems.

## xSeries 240 / Netfinity 5600 Tape Options

| Part Number | Tape Drives | Bays Supported | SCSI Interface (bit) | Form Factor | Termination Included | 68/50-pin Converter Incl | Ext Tape Enclosures |
|---|---|---|---|---|---|---|---|
| 09N4042 | 10/20GB NS Internal SCSI Tape Drive[1] | A, B | 8 | 89mm (3.5in) SL or 133mm (5.25in) HH | Y | Y | 3510020 |
| 00N7991 | 20/40GB DDS/4 4mm Internal Tape Drive[2] | A, B | 16 Ultra2 LVD | 89mm (3.5in) HH or 133mm (5.25in) HH | N | - | 3510020[5], 3551001[4] |
| 09N4040 | 20/40GB DLT Internal SCSI Tape Drive[1] | A+B | 8 | 133mm (5.25in) FH | N | Y | 3503B0X[5], 3551001 |
| 00N7990 | 40/80GB DLT Internal SCSI Tape Drive[2] | A+B | 16 Ultra2 LVD | 133mm (5.25in) FH | N | - | 3503B0X[5], 3551001[4] |
| 00N8017 | 60/120GB 8mm M2 SCSI Tape Drive[2] | A, B | 16 Ultra2 LVD | 133mm (5.25in) HH | N | - | 3510020[5], 3551001[4] |
| 00N8016 | 100/200GB LTO Tape Drive[2] | A+B | 16 Ultra2 LVD | 133mm (5.25in) FH | N | - | 3551001[4] |
| 24P2396 | 100/200GB LTO Half-High Tape Drive[2] | A, B | 16 Ultra2 LVD | 133mm (5.25in) HH | N | - | 3551001[4] |
| 24P2398 | 40/80GB Half-High DLTVS Internal SCSI Tape Drive[2] | A, B | 16 Ultra2 LVD | 133mm (5.25in) HH | N | - | 3551001[4] |
| **Tape Autoloaders** | | | | | | | |
| 3502108 | DLT Tape Autoloader | - | 16 | Desktop | Y | - | - |
| 00N7992 | 120/240GB DDS/4 Tape Autoloader[2] | A+B | 16 Ultra2 LVD | 133mm (5.25in) FH | N | - | 3551001[4] |
| 3600109 | 3600 Series 900GB/1.8TB LTO Tape Autoloader[3] | - | 16 Ultra2 LVD | Tower or 6U Rack | Y | - | - |
| **External Tape Libraries[6]** | | | | | | | |
| 3502x14 | DLT Tape Library | - | 16 | Desktop or Rack | Y | - | - |
| 3570C2X | Magstar MP 3570 Tape Subsystem | - | HVD | 6U Rack | Y | - | - |
| 3600220 | 3600 Series 2/4TB LTO Tape Library (Tower) | - | 16 Ultra2 LVD | Tower | Y | - | - |
| 3600R20 | 3600 Series 2/4TB LTO Tape Library (Rack) | - | 16 Ultra2 LVD | 5U Rack | Y | - | - |
| 09N4048 | 3600 Series LTO Drive Upgrade Option[7] | - | 16 Ultra2 LVD | - | N | - | - |
| **External Tape Enclosures** | | | | | | | |
| 3510020 | External Half-High SCSI Storage Enclosure[8] | - | 8/16 | Desktop | N | N | - |
| 3503B0X | DLT External SCSI Enclosure[9] | | 16 | Desktop | N | N | - |
| 3551001 | NetMEDIA Storage Expansion Unit EL[10] | - | 16 | Rack | Y | N | - |
| 10L7113 | NetMEDIA Systems Management Adapter[11] | - | 16 LVD | - | N | N | 3551001 |

| Associated Options | | | | | | | |
|---|---|---|---|---|---|---|---|
| 00N7956 | 68-pin External Multimode LVD/SE SCSI Terminator | - | 16 LVD/SE | Ext | Y | N | 3510020, 3503B0X |
| 10K2340 | Media BayTray and LVD Cable Kit[2, 4] | - | 16 LVD | Int | Y | N | 3551001 |

Note: xSeries 240 / Netfinity 5600 includes a wide two-drop single-ended terminated cable which can be used for attachment of internal tape drives to the onboard Ultra2 controller when the hot-swap backplane is attached to a RAID controller. If LVD support is required, an optional LVD cable must be ordered. An external Ultra2 SCSI port is available with a 0.8mm VHDCI connector. External tape enclosures are supported by the standard external SCSI port or PCI Wide Ultra160 SCSI Adapter (P/N 19K4646) which has an external 0.8mm VHDCI connector.
1. Requires PCI Wide Ultra160 SCSI Adapter (P/N 19K4646), which contains a five-drop multi-mode terminated LVD SCSI cable, when the onboard Ultra2 SCSI controller is connected to the backplane.
2. If the backplane is connected to the onboard Ultra2 SCSI controller, PCI Wide Ultra160 SCSI Adapter (P/N 19K4646), which contains a five-drop multi-mode terminated LVD SCSI cable, is required to support LVD mode. If the backplane is connected to an optional RAID controller, the two-drop multi-mode terminated LVD SCSI cable included in the Media Bay Tray and LVD Cable Kit is required to support LVD mode. Connecting an LVD tape device to the single-ended terminated cable shipped with the server limits the tape device to single-ended SCSI rules.
3. If installed in a rack, a fixed shelf is required. Allow an additional 1U for the fixed shelf. One unit only per shelf is supported.
4. LVD support for LVD devices installed in a NetMEDIA Storage Expansion Unit EL (P/N 3551001) requires replacement of the standard single-ended internal cables with one or more (depending on configuration) cables from Media Bay Tray and LVD Cable Kit (P/N 10K2340) which contains a single two-drop multi-mode terminated cable. If the standard cables are used for attachment to LVD devices, single-ended SCSI rules and bus speeds apply.
5. Requires 68-pin External Multimode LVD/SE SCSI terminator (P/N 00N7956).
6. Tape library attributes and prerequisites are located in Appendix B: Tape Library Attributes.
7. Install in second drive bay of 3600 Series LTO Tape Libraries or in either of the two bays of 3600 Series 2-Drive 20-Cartridge Expander Module to increase performance. Includes an LTO (Ultrium) drive and a one-meter external LVD SCSI cable.
8. Provides a black desktop 133mm (5.25in) half-high (HH) tape enclosure. Connector is configurable as 50-pin Centronix or 68-pin high density. Requires either tape drive self termination or 68-pin External Multimode LVD/SE SCSI Terminator (P/N 00N7956).
9. Provides a black desktop DLT tape enclosure with a 68-pin high density external connector. Requires termination by the tape drive or by installation of an External Multimode LVD/SE SCSI terminator (P/N 00N7956).
10. NetMEDIA Storage Expansion Unit EL (P/N 3551001) is a black 3U, 19in rack mountable tape enclosure which includes two full-high (FH) or four half-high (HH) extended length 133mm (5.25in) bays, two external 68-pin high density connectors and two internal four-drop single-ended terminated 16-bit SCSI cables for device attachment. Two power supplies and two power cords are also included. Tip: The front rail clips will need to be reversed and screwed in from behind to secure the unit in a 930842x rack.
11. NetMEDIA Systems Management Adapter (P/N 10L7113) may be installed in a 3551001 to provide repeater function, LVDS interface, aggregate cable lengths up to 12m when attached to an LVD SCSI controller, and auto-termination when the 3551001 is powered off. External connector is 0.8mm VHDCI.

Note: Additional tape attributes can be found in Appendix A: Tape Drive Attributes.

## xSeries 240 / Netfinity 5600 Sample Configurations

Note: The following sample configurations are for illustration only and may not be suitable for any specific customer installation. Contact your IBM Business Partner or IBM Marketing Representative for assistance with your specific configuration requirements.

### High Availability Application Server

| Part Number | Description | Quantity | Usage |
|---|---|---|---|
| 8664-71Y | Netfinity 5600 933MHz/256KB, 256MB ECC, Open, 40X, PCI | 1 | - |
| 33L3060 | 256MB, 133MHz SDRAM ECC RDIMM | 1 | 512MB total system memory |
| 37L7204 | 9.1GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD | 2 | 9.1GB mirrored for NOS |
| 37L7205 | 18.2GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD | 4[1] | - |
| 00N8017 | 60/120GB 8mm M2 SCSI Tape Drive | 1 | - |
| 10K2340 | Media Bay Tray and LVD Cable Kit | 1 | - |
| 37L6091 | ServeRAID-4L Ultra160 SCSI Controller | 1 | RAID 5 |
| 33L3760 | 250W Hot-Swap Redundant Power Supply | 1 | Full power redundancy |
| 6331N2N | E54 Color Monitor 15in (350mm, 13.8in Viewable Image Size), stealth black | 1 | |
| 94G3135 | APC Smart-UPS 1000 | 1 | UPS |

1. Four HDDs are used for RAID 5 protection. Effective capacity is three HDDs or 54.6GB

This tower server is configured to act as the foundation for business critical applications your business cannot afford to be without. Configured with enough HDD storage to mirror the operating system and provide a standard RAID 5 environment for data, optional hot-swap redundant power and UPS for power even during a blackout, this server represents the leading edge in high availability. An internal tape drive is included to back up that all important asset--data. A modem could be included to allow out-of-band (non-LAN) system management utilizing the integrated Netfinity Advanced System Management Processor.

### High Availability File Server

| Part Number | Description | Quantity | Usage |
|---|---|---|---|
| 8664-81Y | xSeries 240 1GHz/256KB, 256MB ECC, Open, 40X, PCI | 1 | - |
| 37L7204 | 9.1GB 10K-4 Ultra2 SCSI Hot-Swap SL HDD | 6[1] | - |
| 00N8017 | 60/120GB 8mm M2 SCSI Tape Drive | 1 | - |
| 10K2340 | Media Bay Tray and LVD Cable Kit | 1 | - |
| 37L6889 | ServeRAID-4H Ultra160 SCSI Controller | 1 | RAID 5 array, with hot-spare |
| 33L3760 | 250W Hot-Swap Redundant Power Supply | 1 | Full power redundancy |
| 6331N2N | E54 Color Monitor 15in (350mm, 13.8in Viewable Image Size), stealth black | 1 | - |
| 94G3135 | APC Smart-UPS 1000 | 1 | - |

1. Six HDDs are used for RAID 5 protection. One HDD is identified as a hot-spare. Effective capacity is four HDDs or 36.4GB

This tower model is configured to meet the need of server consolidation. Many businesses are trying to get their arms around the dispersed departmental servers that have grown up around the enterprise. By moving multiple servers onto one platform there is only one system to manage both hardware and software. There is potentially less expense for service, software licenses, etc., and there is less concern about single points of failure because the xSeries240 is designed for high availability. This configuration includes RAID-protected internal storage, a third power supply which provides fully redundant power, a UPS to help protect the system against a momentary electricity loss, and an internal tape drive that backs up as much as 40GB per tape in addition to all the standard features of the xSeries 240.

# IBM xSeries 250

| Part Number | Processor Speed (MHz)[2] | Number of Processors (Std/Max) | L2 ECC Cache | Memory (Std/Max) (R = RDIMM)[3] | Form Factor | Power Supply Quantity (Std/Max) | Hot-Swap (Power, Slots, HDD, Fans) | Redundancy (Optional, Standard) | Adv System Management Processor | Onboard Ethernet (Mbps) | SCSI Controller (Dual, Ultra, RAID) | Removable Media Bays (Total/Avail) | Internal Hard Disk Drive (Std/Max) | CD-ROM (IDE) | Bays (Total/Avail) | Slots (Total/Avail) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **xSeries 250 At-A-Glance** | | | | | | | | | | | | | | | | |
| 8665-61Y | 700 | 1/4 | 1MB | 512MB(R)/16GB | Tower | 2/4 | P, S, H, F | S-Fans O-Power[4] | Y | 10/100 | D,U2 | 4/2 | 0/734GB | 48X-20[5] | 14/12 | 6/6 |
| 8665-6RY[1] | 700 | 1/4 | 1MB | 512MB(R)/16GB | Rack (8U) | 2/4 | P, S, H, F | S-Fans O-Power[4] | Y | 10/100 | D,U2 | 4/2 | 0/734GB | 48X-20[5] | 14/12 | 6/6 |
| 8665-71Y | 700 | 1/4 | 2MB | 512MB(R)/16GB | Tower | 2/4 | P, S, H, F | S-Fans O-Power[4] | Y | 10/100 | D,U2 | 4/2 | 0/734GB | 48X-20[5] | 14/12 | 6/6 |
| 8665-7RY[1] | 700 | 1/4 | 2MB | 512MB(R)/16GB | Rack (8U) | 2/4 | P, S, H, F | S-Fans O-Power[4] | Y | 10/100 | D,U2 | 4/2 | 0/734GB | 48X-20[5] | 14/12 | 6/6 |
| 8665-81Y | 900 | 1/4 | 2MB | 512MB(R)/16GB | Tower | 2/4 | P, S, H, F | S-Fans O-Power[4] | Y | 10/100 | D,U2 | 4/2 | 0/734GB | 48X-20[5] | 14/12 | 6/6 |
| 8665-8RY[1] | 900 | 1/4 | 2MB | 512MB(R)/16GB | Rack (8U) | 2/4 | P, S, H, F | S-Fans O-Power[4] | Y | 10/100 | D,U2 | 4/2 | 0/734GB | 48X-20[5] | 14/12 | 6/6 |

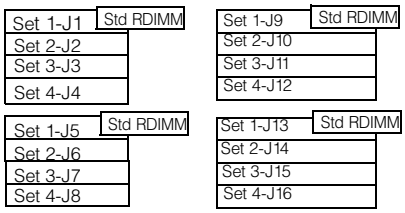
1. Housed in a 19in rack-mountable drawer and ships standard without a keyboard or mouse. See Rack Cabinets and Options section for supported IBM racks.
2. Intel Pentium III Xeon processor with integrated full-speed ECC L2 cache and 100MHz access to memory and I/O buses.
3. Advanced Chipkill ECC memory corrects two-, three-, and four-bit memory errors.
4. An optional 250W Hot-Swap Redundant Power Supply (P/N 33L3760) is required for redundancy. See "Power" under "xSeries 250 Power, Monitor & Accessories" for additional information.
5. Variable read rate. Actual playback speed will vary and is often less than the maximum possible.

## Netfinity xSeries 250 Processor Upgrades

| Part Number | Processor Upgrades | SMP Support[1] | Processor Speed Upgrade[2] |
|---|---|---|---|
| 10K2331 | Netfinity 700MHz/1MB Upgrade II with Pentium III Xeon Processor | 61Y, 6RY | - |
| 10K2332 | Netfinity 700MHz/2MB Upgrade II with Pentium III Xeon Processor | 71Y, 7RY | 6xY |
| 19K4635 | xSeries 250 900MHz/2MB Upgrade with Pentium III Xeon Processor | 81Y, 8RY | 6xY, 7xY |

1. Three additional processors may be installed, providing a maximum of four. All processors must be identical in type, speed, and cache size.
2. Requires removal of the standard processor. A maximum of four processors may be installed. All processors must be identical in type, speed and cache size. Upgrades may require a BIOS update. To obtain the latest Flash BIOS, access www.pc.ibm.com/support and enter machine "Type-Model" in Quick Path. Select "Downloadable files" and then "BIOS."

## Netfinity xSeries 250 Memory




All RDIMMs installed in each set must be the same size, but all the sets do not have to contain RDIMMs of the same size. Install RDIMM sets in numerical sequence from one to four.

| Total Memory[1] | Quantity of RDIMMs Added[2] | | | |
|---|---|---|---|---|
| | 128MB (33L3113) | 256MB (33L3115) | 512MB (33L3117)[4] | 1GB (33L3119) |
| 512MB | 4 x 128 RDIMMs standard | - | - | - |
| 1GB | 4 | - | - | - |
| 1.5GB | - | 4 | - | - |
| 2GB | 4 | 4 | - | - |
| 2.5GB | - | 8 | - | - |
| 3GB | 4 | - | 4 | - |
| 4GB | 4 | 4 | 4 | - |
| 5GB | 4 | - | 8 | - |
| 6GB[3] | - | 8 | 8 | - |
| 7GB[3] | - | 4 | 12 | - |
| 8GB[3] | - | - | 16 | - |
| 9GB | 4 | - | - | 8 |
| 10GB[3] | - | - | 12 | 4 |
| 12GB[3] | - | - | 8 | 8 |
| 14GB[3] | - | - | 4 | 12 |
| 16GB[3] (max) | - | - | - | 16 |

This table does not represent all possible memory configurations. Memory modules may vary in price per MB. Selection of smaller RDIMMs may provide a more cost-effective alternative to using larger RDIMMs.
1. Network operating systems may limit the maximum amount of addressable memory. See operating system specifications for further information.
2. To obtain the Quantity of memory identified in the "Total Memory" column, select the appropriate row and order the quantity of RDIMMs identified in all columns for that row. Example: For 2GB, order 4 x 33L3113 plus 4 x 33l3115.
3. Requires removal of standard RDIMMs.
4. The 2GB memory option (P/N 33L3147), each of which includes four 512MB RDIMMs, can be substituted for a quantity of four 512MB (P/N 33L3117) RDIMMs.

| Part Number | Memory Description[1] |
|---|---|
| 33L3113 | Netfinity 128MB, 100MHz ECC SDRAM RDIMM |
| 33L3115 | Netfinity 256MB, 100MHz ECC SDRAM RDIMM |
| 33L3117 | Netfinity 512MB, 100MHz ECC SDRAM RDIMM[2] |
| 33L3119 | Netfinity 1GB 100MHz ECC SDRAM RDIMM |
| 33L3147 | 2GB 100MHz ECC SDRAM RDIMM Kit (4 x 512MB)[2] |

1. Due to four-way interleaving all RDIMMs installed in each set must be the same size, but all the sets do not have to contain RDIMMs of the same size. Memory must be installed in sets of four identical RDIMMs (example: quantity four of 33L3113). Install RDIMM sets in numerical sequence from Set 1 to Set 4. Chipkill support is provided on the memory card.
2. Due to the new technology used by the 512MB RDIMMs contained in P/N 33L3147, they should not be mixed within a set with Netfinity 512MB 100MHz ECC SDRAM RDIMM (P/N 33L3117).

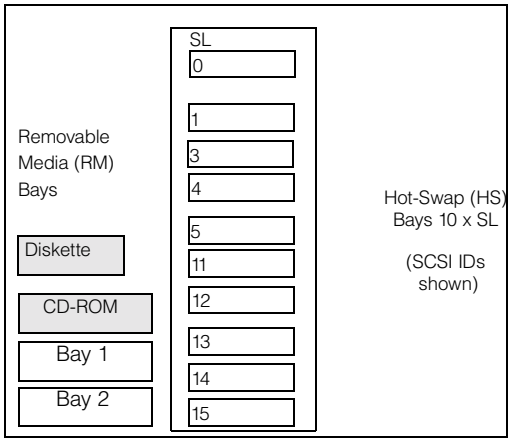
## xSeries 250 Hard Disk Drive (HDD) Storage

| Total Int Storage[1] | 7200RPM HDDs | | | 10,000RPM HDDs | | | | 15,000RPM HDDs | |
|---|---|---|---|---|---|---|---|---|---|
| | 9.1GB 37L7201[2] | 18.2GB 37L7202[2] | 36.4GB 37L7203[2] | 9.1GB 37L7204[2] | 18.2GB 37L7205[2] | 36.4GB 37L7206[2] | 73.4GB 06P5756[2] | 9.1GB 19K0655[2] | 18.2GB 19K0656[2] |
| 0GB | Standard on base models | | | | | | | | |
| 9.1GB | 1 | - | - | 1 | - | - | - | 1 | - |
| 18.2GB | 2 | 1 | - | 2 | 1 | - | - | 2 | 1 |
| 27.3GB | 3 | - | - | 3 | - | - | - | 3 | - |
| 36.4GB | 4 | 2 | 1 | 4 | 2 | 1 | - | 4 | 2 |
| 45.5GB | 5 | - | - | 5 | - | - | - | 5 | - |
| 54.6GB | 6 | 3 | - | 6 | 3 | - | - | 6 | 3 |
| 63.7GB | 7 | - | - | 7 | - | - | - | 7 | - |
| 72.8GB | 8 | 4 | 2 | 8 | 4 | 2 | - | 8 | 4 |
| 81.9GB | 9 | - | - | 9 | - | - | - | 9 | - |
| 91GB | 10 | 5 | - | 10 | 5 | - | - | 10 | 5 |
| 109.2GB | - | 6 | 3 | - | 6 | 3 | - | - | 6 |
| 127.4GB | - | 7 | - | - | 7 | - | - | - | 7 |
| 145.6GB | - | 8 | 4 | - | 8 | 4 | - | - | 8 |
| 163.8GB | - | 9 | - | - | 9 | - | - | - | 9 |
| 182GB | - | 10 | 5 | - | 10 | 5 | - | - | 10 |
| 218.4GB | - | - | 6 | - | - | 6 | - | - | - |
| 254.8GB | - | - | 7 | - | - | 7 | - | - | - |
| 291.2GB | - | - | 8 | - | - | 8 | - | - | - |
| 327.6GB | - | - | 9 | - | - | 9 | - | - | - |
| 364GB | - | - | 10 | - | - | 10 | - | - | - |
| 367GB | - | - | - | - | - | - | 5 | - | - |
| 440.4GB | - | - | - | - | - | - | 6 | - | - |
| 513.8GB | - | - | - | - | - | - | 7 | - | - |
| 587.2GB | - | - | - | - | - | - | 8 | - | - |
| 660.6GB | - | - | - | - | - | - | 9 | - | - |
| 734GB (max) | - | - | - | - | - | - | 10 | - | - |

This table does not represent all possible HDD configurations.
1. Select a total storage row then select the quantity of HDDs from a column corresponding to the HDD of choice. Total Internal Storage listed is within +/- 0.2GB unless otherwise noted.
2. xSeries 250 ships standard with an Ultra2 SCSI storage controller. The standard backplane supports Ultra160 HDDs at Ultra2 speeds (80MBps) when connected to the standard integrated storage controller or at Ultra160 speeds (160MBps) with the addition of an optional Ultra160 storage controller.

| Bay | Form Factor | Height | Front Access | Usage |
|---|---|---|---|---|
| - | 89mm (3.5in) | SL | Yes | Diskette |
| - | 133mm (5.25in) | HH | Yes | IDE CD-ROM |
| RM 1 | 133mm (5.25in) | HH[1] | Yes | Open |
| RM 2 | 133mm (5.25in) | HH[1] | Yes | Open |
| 1 … 10 | HS | SL | Yes | Open |
| NB3[2] | 19in Rack | 3U | Yes | Open |

1. Two half-high (HH) bays can be combined to support a single full-high (FH) device
2. Tower configured systems support installation of up to three NetBAY3s. See IBM Netfinity NetBAY3 Stackable Enclosure section for supported devices.




Netfinity NetBAY3 (NB3)
(Optional on Tower Configurations)

All bays are SL. Bus A includes the top five bays supported by the standard integrated Ultra2 SCSI controller connected by a standard 16-bit LVDS cable. Bus B includes the lower five bays. For clarity, the SCSI IDs are identified.

| Part Number | Description | RPM | Height | Bays Supported | Max Qty |
|---|---|---|---|---|---|
| **Ultra160 HDDs[1]** | | | | | |
| 37L7201 | 9.1GB Ultra160 SCSI Hot-Swap SL HDD | 7200 | SL | See diagram | 10 |
| 37L7202 | 18.2GB Ultra160 SCSI Hot-Swap SL HDD | 7200 | SL | See diagram | 10 |
| 37L7203 | 36.4GB Ultra160 SCSI Hot-Swap SL HDD | 7200 | SL | See diagram | 10 |
| 37L7204 | 9.1GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD | 10000 | SL | See diagram | 10 |
| 37L7205 | 18.2GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD | 10000 | SL | See diagram | 10 |
| 37L7206 | 36.4GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD | 10000 | SL | See diagram | 10 |
| 19K0655 | 9.1GB 15Krpm Ultra160 SCSI Hot-Swap HDD | 15000 | SL | See diagram | 10 |
| 19K0656 | 18.2GB 15Krpm Ultra160 SCSI Hot-Swap HDD | 15000 | SL | See diagram | 10 |
| 06P5756 | 73.4GB 10Krpm Ultra160 SCSI Hot-Swap SL HDD | 10000 | SL | See diagram | 10 |
| **Associated Options** | | | | | |
| 37L7086 | xSeries Ultra160 SCSI Repeater Card[2] | - | - | - | 1 |

| | External Storage Expansion Units[3] | Form Factor |
|---|---|---|
| 35311RU | EXP300 Storage Expansion Unit[4] | Rack (3U) |
| 09N7296 | EXP300 Rack-to-Tower Conversion Kit | - |
| 35601RU | FAStT EXP500 Storage Expansion Unit[5] | Rack (3U) |
| 35421RU | FAStT200 Storage Server[6, 7] | Rack (3U) |
| 35422RU | FAStT200 HA Storage Server[6] | Rack (3U) |
| 19K1121 | FAStT200 Redundant RAID Controller | - |

1. xSeries 250 contains an Ultra2 hot-swap, split backplane which supports Ultra160 HDDs at Ultra2 bus speeds when connected to the standard integrated storage controller. Ultra160 bus speeds are supported with the addition of an optional Ultra160 storage controller.
2. xSeries Ultra160 SCSI Repeater Card kit includes a jumper cable and installation hardware. This option is used to convert the standard split backplane into a single SCSI channel supporting up to 10 HDDs.
3. Not supported by the onboard external SCSI port. To configure one of the SCSI storage devices listed here, select an optional SCSI controller then refer to Appendix D: Cables - Storage Units - Controllers to confirm that the controller supports the desired External Storage Expansion Unit and to select a supported cable. For HDD or other expansion unit options, see the specific expansion unit section. For Fibre Channel storage devices, refer to the Fibre Array Solutions section.
4. EXP300 includes a single 2M Ultra2 SCSI cable and dual hot-swap 500W power supplies, each with its own power cord. To convert an EXP300 to a tower form factor, Netfinity EXP300 Rack-to-Tower Conversion Kit (P/N 09N7296) is required.
5. FAStT EXP500 Storage Expansion Unit (P/N 35601RU) includes dual hot-swap 350W power supplies, each with its own power cord.
6.The FAStT200 includes two hot-swap, 350W auto-ranging redundant power supplies, each with its own power cord.
7. Can be upgraded to FAStT200 HA Storage Server through the addition of a FAStT200 Redundant RAID Controller (P/N 19K1121).

## xSeries 250 Internal SCSI Cabling

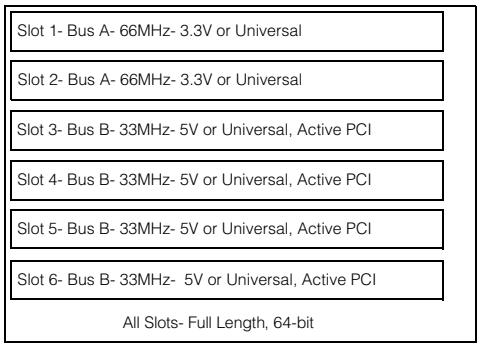
The xSeries 250 contains a hot-swap backplane architected into two backplanes, each containing five drives. This split backplane supports a total of 10 hot-swap SCA-2 compliant drives. One of the backplanes is connected to one of the internal connectors of the standard Ultra2 SCSI controller through a 16-bit LVDS cable. Another 16-bit LVDS cable is connected to the other backplane connector; however, this cable is left disconnected at the other end. The standard configuration allows support of five drives from the standard SCSI controller. If additional drive bays are needed, an optional xSeries Ultra160 SCSI Repeater Card (P/N 37L7086) must be installed to connect both backplanes into a single channel, 10-bay configuration. The repeater card is shipped with a jumper cable and installation hardware. Channel A of the dual-channel, Wide Ultra2 SCSI controller only supports external SCSI attachment and is connected directly to an external 0.8mm VHDCI SCSI connector. To support SCSI devices in the internal 5.25in half-high bays, a two-drop, 16-bit LVD SCSI cable can be used to connect channel B of the integrated Wide Ultra2 SCSI controller to SCSI devices in one or both of the removable media bays when an optional RAID controller is used to support the internal hot-swap drive bays. If the standard SCSI controller is used to support the hot-swap drive bays, then an optional SCSI adapter is required to support installation of devices in these 5.25/3.5in half-high bays. Most configurations for this class of server will generally incorporate an optional ServeRAID-4 Ultra160 SCSI controller to support internal RAID protection. The split backplane of the xSeries 250 is optimized to support a two-channel ServeRAID controller to enhance performance. Each backplane can be cabled to an internal connector of the RAID controller by removing the standard 16-bit LVDS cable from the Ultra2 SCSI controller and attaching it to one of the RAID controller connections. The other standard 16-bit LVDS cable is attached to the remaining internal connector of the RAID controller. In configurations where a single channel RAID array is required, an xSeries Ultra160 SCSI Repeater Card must be installed.

## xSeries 250 I/O Options

| Part Number | Description | Adapter Length | PCI Support[1] | Slots Supported[1] | Hot-Plug[2] | PCI Voltage Key | MHz |
|---|---|---|---|---|---|---|---|
| | **Storage Controllers[3]** | | | | | | |
| 37L6080 | ServeRAID-4M Ultra160 SCSI Controller[4] | Full | 64-bit | 1 … 6 | X | Universal | 33 |
| 37L6091 | ServeRAID-4L Ultra160 SCSI Controller[5] | Full | 64-bit | 1 … 6 | X | Universal | 33 |
| 37L6889 | ServeRAID-4H Ultra160 SCSI Controller[6] | Full | 64-bit | 1 … 6 | X | Universal | 33 |
| 06P5736 | ServeRAID-4Mx Ultra160 SCSI Controller[7] | Full | 64-bit | 1 … 6 | X | Universal | 66 |
| 06P5740 | ServeRAID-4Lx Ultra160 SCSI Controller[8] | Half | 64-bit | 1 … 6 | X | Universal | 66 |
| 19K4646 | PCI Wide Ultra160 SCSI Adapter[9] | Half | 64-bit | 1 … 6 | - | Universal | 66 |
| 02K3454 | PCI Fast/Wide Ultra SCSI Adapter[25] | Half | 32-bit | 3 … 6 | - | 5 | 33 |
| | **Fiber Storage Controllers and Options[10]** | | | | | | |
| 00N6881 | Netfinity FAStT Host Adapter | Half | 64-bit | 1 … 6 | X | Universal | 66 |
| 35521RU | FAStT500 Storage Server | - | - | - | - | - | - |
| 35421RU | FAStT200 Storage Server | - | - | - | - | - | - |
| 35422RU | FAStT200 HA Storage Server | - | - | - | - | - | - |
| 35341RU | SAN Fibre Channel Managed Hub | - | - | - | - | - | - |
| 2109S08 | SAN Fibre Channel Switch, 8-port | - | - | - | - | - | - |
| 2109S16 | SAN Fibre Channel Switch, 16-port | - | - | - | - | - | - |
| 2108R3L | SAN Data Gateway Router Ultra SCSI LVD Port[11] | - | - | - | - | - | - |
| | **Networking[12]** | | | | | | |
| | **Ethernet[13]** | | | | | | |
| 09N9901 | 10/100 EtherLink Server Adapter by 3Com[14] | Half | 32-bit | 1 … 6 | X | Universal | 33 |
| 19K4401 | Netfinity Gigabit Ethernet Adapter (copper) | Half | 64-bit | 1 … 6 | X | Universal | 33 |
| 06P3601 | 10/100 Ethernet Server Adapter[14] | Half | 32-bit | 1 … 6 | X | Universal | 33 |
| 06P3701 | Gigabit Ethernet SX Server Adapter (fiber) | Half | 64-bit | 1 … 6 | X | Universal | 66 |
| | **Token Ring** | | | | | | |
| 34L0701 | Token-Ring 16/4 PCI Adapter 2 with Wake on LAN[14] | Half | 32-bit | 1 … 6 | X | Universal | 33 |
| 34L5001 | 16/4 Token-Ring PCI Management Adapter[14] | Half | 32-bit | 1 … 6 | X | Universal | 33 |
| 34L5201 | High-Speed 100/16/4 Token-Ring PCI Management Adapter[14] | Half | 32-bit | 1 … 6 | X | Universal | 33 |
| | **Communications[15]** | | | | | | |
| 33L4618 | V.90 PCI Data/Fax Modem[16] | Half | 32-bit | 3 … 6 | - | 5 | 33 |
| 37L14xx | Serial I/O SST 8, 16, and 128 port adapters[17] | Half | 32-bit | 3 … 6 | - | 5 | 33 |
| | **Systems Management[18]** | | | | | | |
| 01K7209 | Netfinity Advanced System Management PCI Adapter[19] | Full | 32-bit | 3 … 6[22] | - | 5 | 33 |
| 03K9309 | Netfinity Advanced System Management Interconnect Cable Kit[20] | - | - | - | - | - | - |
| 36L9654 | Netfinity Advanced System Management Token-RIng Connection[21] | - | - | - | - | - | - |
| | **Host Attach** | | | | | | |
| 9086001 | Netfinity ESCON Adapter[23] | Full | 32-bit | 3 … 6[24] | - | 5 | 33 |

1. The 5V slots support Universal or 5V adapters. The 3.3V slots support Universal or 3.3V adapters. A 66MHz adapter plugged into a 33MHz slot will operate at 33MHz. A 33MHz adapter plugged into a 66MHz slot limits other adapters installed on the same bus to 33MHz. A 64-bit adapter installed into a 32-bit slot will transfer data at 32-bit rates.
2. Slots three through six include hot-plug capability using IBM's Active PCI technology. For Network Operating System support access www.pc.ibm.com/us/compat.
3. All models include a dual-port, dual-channel, 64-bit Wide Ultra2 SCSI controller with one internal connector (connected to Channel A of the hot-swap split backplane) and one external port with a 0.8mm Very High Density Connection Interface (VHDCI).
4. ServeRAID-4M Ultra160 SCSI Controller is powered by a 100MHz Intel i960 processor and provides two channels, 64MB of battery-backed ECC cache and two internal and two external Ultra160 connectors (only two connectors may be utilized). External connectors are 0.8mm VHDCI.
5. ServeRAID-4L Ultra160 SCSI Controller is powered by a 100MHz Intel i960 processor and provides a single channel, 16MB of ECC cache and either one internal or one external Ultra160 connection. External connector is 0.8mm VHDCI.
6. ServeRAID-4H Ultra160 SCSI Controller is powered by a 266MHz PowerPC 750 processor and provides 128MB of battery-backed ECC cache with two internal and up to four external Ultra160 connectors (only four connectors may be utilized). External connectors are 0.8mm VHDCI.
7. ServeRAID-4Mx Ultra160 SCSI Controller is powered by a 100MHz Intel Zion GC80303 processor that provides 64MB of battery-backed ECC cache and two internal and two external Ultra160 connections (only two connectors may be used). External connections are 0.8mm VHDCI.
8. ServeRAID-4Lx Ultra160 SCSI Controller is powered by a 100MHz Intel Zion GC80303 processor and provides a single channel, 32MB of ECC cache and either one internal or one external Ultra160 connection. External connectior is 0.8mm VHDCI.
9. PCI Wide Ultra160 SCSI Adapter (P/N 19K4646) provides a single channel with one internal connector, a five-drop multi-mode terminated LVD SCSI cable and one external 0.8mm VHDCI connector. Only one of the two connectors may be utilized.
10. See Fibre Array Solutions section for additional configuration information.
11. The 2108R3L SAN Data Gateway Router Ultra SCSI LVD port provides one integrated short-wave optical port and two SCSI ports for tape storage connections (LVD, HVD and single-ended).
12. xSeries 250 includes a full-duplex, 10/100Mbps Ethernet PCI Controller.
13. In a fault-tolerant networking environment, using the fault-tolerant software delivered with the Ethernet adapters of a single manufacturer is recommended. Installing fault-tolerant solutions provided by multiple manufacturers may cause failures if the intermediate drivers provided with the adapters are not compatible. The onboard Ethernet is Intel-based, which is compatible with the two Intel-based optional Ethernet adapters (P/N 06P3601, 06P3701).
14. The Wake-on LAN function of this option is not supported by this server.

15. xSeries 250 includes two USB ports, two high-speed serial/asynchronous ports (NS16550A compatible), and one high-speed (up to 2MB/sec data transfer speed) bidirectional parallel port supporting devices using ECP/EPP/SSP protocols adhering to the IEEE 1284 standard.
16. Due to homologation variances, modem availability may differ by country.
17. See Appendix E for details on Serial I/O Options and configuration limitations.
18. The Netfinity Advanced Systems Management Processor and Interconnect Bus integrated into xSeries 250 works with Netfinity Director to provide significant system management function. When used with optional Netfinity Advanced System Management PCI Adapter (P/N 01K7209) and Netfinity Advanced System Management Interconnect Cable Kit (P/N 03K9309) additional management and control of up to 12 service processors from a remote console through a single modem or LAN connection is possible.
19. Includes PCI adapter, Netfinity Advanced System Management Interconnect Cable Kit components and 56W AC adapter which requires a separate power source. Provides an integrated 10/100 Ethernet port and PCMCIA slot to support optional Netfinity Advanced System Management Token-Ring Connection (P/N 36L9654).
20. Required for all Netfinity servers containing a standard Advanced System Management Processor that are to be interconnected for system management support through a LAN or modem connection. Up to 12 service processors may be interconnected (including standard and optional processors) with an aggregate connection length of no more than 91.4m (300ft). A customer-supplied Ethernet cable is required for each interconnection.
21. Contains an IBM Turbo 16/4 Token-Ring PCI Card, which installs in the PCMCIA card slot of Netfinity Advanced System Management PCI Adapter, and a PC Card to 9-pin D-Shell cable which is routed to a rear chassis cut-out. The Netfinity Advanced System Management PCI Adapter's integrated Ethernet port and Netfinity Advanced System Management Token-Ring Connection cannot be connected or used together.To download the latest firmware, access www.pc.ibm.com/ww/eserver/xseries, select Support and Downloads, the server brand, Hardware Drivers … (in the Fixes menu), server family, model, then Advanced Systems Management in the Downloadable Files menu.
22. A maximum quantity of one is supported.
23. Provides an ESCON MIC and a DB9 Serial Port. Cables are not included but are available through S/390 channels. Contact your IBM representative for additional information.
24. A maximum of two 9086001 adapters (installed in nonadjacent slots) are supported in a single server.
25. PCI Fast/Wide Ultra SCSI Adapter (P/N 02K3454) provides one external 68-pin high density connector that supports external SCSI devices such as tape enclosures.


Slot 1- Bus A- 66MHz- 3.3V or Universal
Slot 2- Bus A- 66MHz- 3.3V or Universal
Slot 3- Bus B- 33MHz- 5V or Universal, Active PCI
Slot 4- Bus B- 33MHz- 5V or Universal, Active PCI
Slot 5- Bus B- 33MHz- 5V or Universal, Active PCI
Slot 6- Bus B- 33MHz- 5V or Universal, Active PCI
All Slots- Full Length, 64-bit

## xSeries 250 Power, Monitors & Accessories

| Part Number | Description |
|---|---|
| | **Power[1]** |
| 33L3760 | 250W Hot-Swap Redundant Power Supply |
| | **Uninterruptible Power Supply (UPS)[2]** |
| 94G3135 | APC Smart-UPS 1000 |
| 94G3136 | APC Smart-UPS 1400 |
| 94G6674 | APC Smart-UPS 1400RMB[3] |
| 94G6676 | APC Smart-UPS 3000RMB[3] |
| 37L6861 | APC Smart-UPS 5000RMB[4] |
| | **Monitors[5]** |
| 633347N | E51 Color Monitor 15in (350mm, 13.8in Viewable Image Size), stealth black[6] |
| 6331N2N | E54 Color Monitor 15in (350mm, 13.8in Viewable Image Size), stealth black[6] |
| 6332J1N | E74 Color Monitor 17in (403mm, 15.9in Viewable Image Size), stealth black[6] |
| 66274AN | G78 Color Monitor 17in (406.4mm, 16in Viewable Image Size), stealth black[6] |
| 9511AG4 | T540 Flat Panel Color Monitor 15in (381mm, 15in viewable image), stealth black[7] |

1. xSeries 250 includes two 250W hot-swap redundant power supplies, with the ability to accept two additional 250W Hot-Swap Redundant Power Supply (P/N 33L3760). Each power supply includes its own 9ft power cord for attachment to a low voltage UPS, PDU or wall outlet. To assist in determining when an additional power supply is required to preserve redundancy, a "Non-Redundant LED" is a standard feature of the xSeries 250. Predicting whether a particular configuration will require an additional power supply for redundancy is very complex. However, once the system is installed, the "Non-Redundant LED" will indicate when an additional power supply is required. The following sample configuration is provided as a reference.

| Number of Power Supplies | System Configuration Supported |
|---|---|
| **Typical Non-Redundant Configuration** | |
| 2 | 2 x Processors |
| | 3 x PCI Adapters |
| | 4 x Half-High or 5 Slim-Line HDDs |
| | 8 x 512MB RDIMMs |
| **Typical Redundant Configuration** | |
| 3[8] | 4 x Processors |
| | 6 x PCI Adapters |
| | 7 x Half-High or 10 Slim-Line HDDs |
| | 16 x 512MB RDIMMs |
| 4 | **Full Configuration with Redundancy** |

2. For runtimes and UPS attributes see Appendix C: UPS Runtime Estimate.
3. Height is 3U. See Rack Cabinets and Options section for supported IBM racks.
4. Height is 5U. See Rack Cabinets and Options section for supported IBM racks.
5. xSeries 250 uses an SVGA controller (S3 Trio 3D chipset) with 4MB of video memory.
6. Installation within a rack requires optional Monitor Compartment (P/N 94G7444).
7. Installation within a rack requires optional Netfinity Flat Panel Monitor Rack Mount Kit II (P/N 37L6888) and Netfinity Rack Keyboard Tray (P/N 28L4707). A space saver keyboard may coexist within the same 28L4707 keyboard tray.
8. The addition of a DLT tape drive may require a fourth power supply to preserve redundancy.

| Part Number | Description |
|---|---|
| **Conversion Kits** | |
| 37L6860 | 8Ux24D Rack-to-Tower Kit[1] |
| 37L6859 | 8Ux24D Tower-to-Rack Kit |
| **Rack and NetBAY[2]** | |
| | Refer to the Rack Cabinets and Options section for information concerning IBM racks and rack-supported devices. |
| **Keyboard and Mouse[3]** | |
| 28L3644 | Space Saver II Keyboard[4, 6] |
| 01K1260 | TrackPoint IV 104-Key Black Keyboard[5, 6] |
| 28L3621 | Preferred Keyboard (stealth black)[5] |
| 10K3849 | 106-key Preferred USB Keyboard with 2-port USB Hub (stealth black)[5] |
| 22P5150 | TrackPoint USB Space Saver Keyboard[4, 6] |
| 33L3244 | Sleek USB Mouse (stealth black) |
| 28L3673 | Sleek 2-Button Stealth Black Mouse |

1. Includes one Netfinity NetBAY3 with casters.
2. xSeries 250 rack models are housed in a 19in rack-mountable drawer and require one of the racks listed in the Rack Cabinets and Options section.
3. xSeries 250 rack models ship without a keyboard or mouse.
4. Installation within a rack requires optional keyboard tray (P/N 28L4707), which stows in ready-to-use position.
5. Installation within a rack requires optional keyboard tray (P/N 28L4707). This keyboard cannot share a keyboard tray with a flat panel display.
6. Advanced TrackPoint IV features are not available on IBM xSeries or Netfinity systems.

## xSeries 250 Tape Options

| Part Number | Tape Drives | Bays Supported | SCSI Interface (bit) | Form Factor | Termination Included | 68/50-pin Converter Incl | Ext Tape Enclosures |
|---|---|---|---|---|---|---|---|
| 00N7991 | 20/40GB DDS/4 4mm Internal Tape Drive | 1, 2 | 16 Ultra2 LVD | 89mm (3.5in) HH or 133mm (5.25in) HH | N | - | 3510020[2], 3551001[1] |
| 00N7990 | 40/80GB DLT Internal SCSI Tape Drive | 1+2 | 16 Ultra2 LVD | 133mm (5.25in) FH | N | - | 3503B0X[2], 3551001[1] |
| 00N8017 | 60/120GB 8mm M2 SCSI Tape Drive | 1, 2 | 16 Ultra2 LVD | 133mm (5.25in) HH | N | - | 3510020[2], 3551001[1] |
| 09N4040 | 20/40GB DLT Internal SCSI Tape Drive | 1+2 | 8 | 133mm (5.25in) FH | N | Y | 3503B0X[2] 3551001 |
| 00N8016 | 100/200GB LTO Tape Drive | 1+2 | 16 Ultra2 LVD | 133mm (5.25in) FH | N | - | 3551001[1] |
| 24P2396 | 100/200GB LTO Half-High Tape Drive | 1, 2 | 16 Ultra2 LVD | 133mm (5.25in) HH | N | - | 3551001[1] |
| | **Tape Autoloaders** | | | | | | |
| 3502108 | DLT Tape Autoloader | - | 16 | Desktop | Y | - | - |
| 00N7992 | 120/240GB DDS/4 Tape Autoloader | 1+2 | 16 Ultra2 LVD | 133mm (5.25in) FH | N | - | 3551001[1] |
| | **External Tape Libraries[3]** | | | | | | |
| 3502x14 | DLT Tape Library | - | 16 | Desktop or Rack | Y | - | - |
| 3570C2X | Magstar MP 3570 Tape Subsystem | - | HVD | 6U Rack | Y | - | - |
| | **External Tape Enclosures** | | | | | | |
| 3510020 | External Half High SCSI Storage Enclosure[4] | - | 8, 16 | Desktop | N | N | - |
| 3503B0X | DLT External SCSI Enclosure[5] | | 16 | Desktop | N | N | - |
| 3551001 | NetMEDIA Storage Expansion Unit EL[6] | - | 16 | Rack | Y | N | - |
| 10L7113 | NetMEDIA Systems Management Adapter[7] | - | 16 LVD | - | N | N | 3551001 |
| | **Associated Options** | | | | | | |
| 00N7956 | 68-pin External Multimode LVD/SE SCSI Terminator | - | 16 LVD/SE | Ext | Y | N | 3510020, 3503B0X |
| 10K2340 | Media BayTray and LVD Cable Kit[1] | - | 16 LVD | Int | Y | N | 3551001 |

Note: xSeries 250 includes a two-drop multimode terminated LVD SCSI cable, an available internal Ultra2 SCSI port and an external Ultra2 0.8mm VHDCI connector.

1. LVD support for LVD devices installed in a NetMEDIA Storage Expansion Unit EL (P/N 3551001) requires replacement of the standard single-ended internal cables with one or more (depending on configuration) cables from Media Bay Tray and LVD Cable Kit (P/N 10K2340) which contains a single two-drop multi-mode terminated cable. If the standard cables are used for attachment to LVD devices, single-ended SCSI rules and bus speeds apply.
2. Requires 68-pin External Multimode LVD/SE SCSI terminator (P/N 00N7956).
3. Tape library attributes and prerequisites are located in Appendix B: Tape Library Attributes.
4. Provides a black desktop 133mm (5.25in) half-high (HH) tape enclosure. Connector is configurable as 50-pin Centronix or 68-pin high density. Requires either tape drive self-termination or 68-pin External Multimode LVD/SE SCSI Terminator (P/N 00N7956).
5. Provides a black desktop DLT tape enclosure with a 68-pin high density external connector. Requires termination by the tape drive or by installation of an External Multimode LVD/SE SCSI terminator (P/N 00N7956).
6. NetMEDIA Storage Expansion Unit EL (P/N 3551001) is a black 3U, 19in rack or NetBAY3/3E mountable tape enclosure which includes two full-high (FH) or four half-high (HH) extended length 133mm (5.25in) bays, two external 68-pin high density connectors and two internal four-drop single-ended terminated 16-bit SCSI cables for device attachment. Two power supplies and two power cords are also included. Tip: The front rail clips will need to be reversed and screwed in from behind to secure the unit in a 930842x rack.
7. NetMEDIA Systems Management Adapter (P/N 10L7113) may be installed in a 3551001 to provide repeater function, LVDS interface, aggregate cable lengths up to 12m when attached to an LVD SCSI controller, and auto-termination when the 3551001 is powered off. External connector is 0.8mm VHDCI.

Note: Additional tape attributes can be found in Appendix A: Tape Drive Attributes.

## xSeries 250 Sample Configurations

Note: The following sample configurations are for illustration only and may not be suitable for any specific customer installation. Contact your IBM Business Partner or IBM Marketing Representative for assistance with your specific configuration requirements.

### High Availability Application Server

| Part Number | Description | Quantity | Usage |
|---|---|---|---|
| 8665-7RY | xSeries 250 Pentium III Xeon 700/2MB, 512MB(R) ECC, OPEN, 40X, PCI (Rack 8U) | 1 | - |
| 33L3113 | Netfinity 128MB, 100MHz ECC SDRAM RDIMM | 4 | - |
| 33L3115 | Netfinity 256MB, 100MHz ECC SDRAM RDIMM | 4 | - |
| 33L3117 | Netfinity 512MB, 100MHz ECC SDRAM RDIMM | 4 | 4GB Total System Memory |
| 10K2332 | Netfinity 700MHz/2MB Upgrade II with Pentium III Xeon Processor | 3 | Total of 4 SMP processors |
| 37L6080 | ServeRAID-4M Ultra160 SCSI Controller | 1 | Optional RAID adapter |
| 37L7204 | 9.1GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD | 2 | 9.1GB mirrored for NOS |
| 37L7205 | 18.2GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD | 6[1] | 72GB RAID 5 with Hot-Spare |
| 00N7990 | 40/80GB DLT Internal SCSI Tape Drive | 1 | - |
| 33L3760 | 250W Hot-Swap Redundant Power Supply | 1 | Full Power Redundancy |
| 66274AN | G78 Color Monitor 17in (406.4mm, 16in Viewable Image Size), stealth black | 1 | |
| 28L3644 | Space Saver II Keyboard | 1 | - |
| 94G6674 | APC Smart-UPS 1400RMB | 1 | - |
| | **External Storage** | | |
| 35311RU | EXP300 Storage Expansion Unit | 1 | Includes 2M Ultra2 cable |
| 37L7206 | 36.4GB 10K-4 Wide Ultra160 SCSI Hot-Swap SL HDD | 14 | RAID 5 Data Storage with Hot-Spare |
| | **Rack** | | |
| 9306200 | Netfinity NetBAY22 | 1 | |
| 09N4290 | NetBAY 1x4 Console Switch | 1 | |
| 94G6667 | Power Cable - Type A14 | 1 | |
| 94G7447 | NetBAY Console Cable Set-12ft | 1 | |
| 94G6670 | Blank Filler Panel Kit | 1 | |

1. Six HDDs are used for RAID 5 protection. One HDD is identified as a hot-spare. Effective capacity is four HDDs or 72.8GB

This rack server is configured to act as the foundation for business critical applications, applications your business cannot afford to be without. Configured with enough HDDs to mirror the operating system and provide a standard RAID 5 environment for data, optional hot-swap redundant power and UPS for power even during a blackout, this server represents the leading edge in high availability. An internal tape drive is included to back up that all important asset--data. A modem could be included to allow out-of-band (non-LAN) system management utilizing the integrated Netfinity Advanced System Management Processor.

### Server Consolidation

| Part Number | Description | Quantity | Usage |
|---|---|---|---|
| 8665-6RY | xSeries 250 Pentium III Xeon 700/1MB, 512MB(R) ECC, OPEN, 40X, PCI (Rack 8U) | 1 | - |
| 33L3113 | Netfinity 128MB, 100MHz ECC SDRAM RDIMM | 4 | 1GB Total System Memory |
| 10K2331 | Netfinity 700MHz/1MB Upgrade II with Pentium III Xeon Processor | 1 | Total of 2 SMP processors |
| 37L6080 | ServeRAID-4M Ultra160 SCSI Controller | 1 | Optional RAID adapter |
| 37L7204 | 9.1GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD | 2 | 9.1GB mirrored for NOS |
| 37L7205 | 18.2GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD | 8[1] | 109GB RAID 5 with Hot-Spare |
| 06P3601 | 10/100 Ethernet Server Adapter | 3 | Total of 4 Ethernet connections |
| 00N7990 | 40/80GB DLT Internal SCSI Tape Drive | 1 | - |
| 66274AN | G78 Color Monitor 17in (406.4mm, 16in Viewable Image Size), stealth black | 1 | |
| 28L3644 | Space Saver II Keyboard | 1 | - |
| 94G6674 | APC Smart-UPS 1400RMB | 1 | - |
| | **Rack** | | |
| 9306200 | Netfinity NetBAY22 | 1 | - |
| 09N4290 | NetBAY 1x4 Console Switch | 1 | - |
| 94G6667 | Power Cable - Type A14 | 1 | Attaches to monitor |
| 94G7447 | NetBAYConsole Cable Set 12ft | 1 | - |
| 94G6670 | Blank Filler Panel Kit | 2 | - |

1. Eight HDDs are used for RAID 5 protection. One HDD is identified as a hot-spare. Effective capacity is six HDDs or 109.2GB

This rack server is configured to meet the need of server consolidation. Many businesses are trying to achieve better control of the dispersed departmental servers that have grown up around the enterprise. By moving multiple servers on to one platform, there is only one system to manage both hardware and software. There is potentially less expense for service, software licenses, etc., and there is less concern about single points of failure because the xSeries 250 is designed for high availability. This configuration includes 109GB of internal HDD storage, features three power supplies which provide fully redundant power, a UPS to help protect the system against a momentary electricity loss, and an internal tape drive that backs up as much as 80GB per tape--in addition to all the standard features of the xSeries 250.

### High Availability File and Print Server

| Part Number | Description | Quantity | Usage |
|---|---|---|---|
| 8665-61Y | xSeries 250 Pentium III Xeon 700/1MB, 512MB(R) ECC, OPEN, 40X, PCI (Tower) | 1 | - |
| 33L3113 | Netfinity 128MB, 100MHz ECC SDRAM RDIMM | 4 | 1GB Total System Memory |
| 10K2331 | Netfinity 700MHz/1MB Upgrade II with Pentium III Xeon Processor | 1 | Total of 2 SMP processors |
| 37L6080 | ServeRAID-4M Ultra160 SCSI Controller | 1 | Optional RAID adapter |
| 37L7086 | xSeries Ultra160 SCSI Repeater Card | 1 | Create single SCSI bus from split backplane |
| 37L7204 | 9.1GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD | 2 | 9.1GB mirrored for NOS |
| 37L7205 | 18.2GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD | 8[1] | 109GB RAID 5 with Hot-Spare |
| 06P3601 | 10/100 Ethernet Server Adapter | 3 | Total of 4 Ethernet connections |
| 00N7990 | 40/80GB DLT Internal SCSI Tape Drive | 1 | - |
| 66274AN | G78 Color Monitor 17in (406.4mm, 16in Viewable Image Size), stealth black | 1 | - |
| 94G3136 | APC Smart-UPS 1400 | 1 | - |

1. Eight HDDs are used for RAID 5 protection. One HDD is identified as a hot-spare. Effective capacity is six HDDs or 109.2GB

This file and print server is designed to handle a high workload with significant storage and availability requirements. With this in mind, the IBM xSeries 250 was selected to provide an affordable price point for a high end file and print server with optional four-way Pentium III Xeon processing, 1GB of system memory (expandable to 16GB), and availability such as battery-backed cache RAID-protected internal hot-swap storage and power protection with an APC Smart-UPS.

# IBM xSeries 300

## xSeries 300 At-A-Glance

| Part Number | Processor Speed (MHz) | Number of Processors (Std/Max) | L2 ECC Cache (KB) | Memory (Std/Max) (R = RDIMM) | Form Factor | Power Supply Quantity (Std/Max) | Hot-Swap (Power, Slots, HDD, Fans) | Redundancy (Optional, Standard) | Adv System Management Processor | Onboard Ethernet (Mbps) | SCSI Controller (Dual, Ultra, RAID) | Removable Media Bays (Total/Avail) | Internal Hard Disk Drive (Std/Max) | CD-ROM (IDE)[4] | Bays (Total/Avail) | Slots (Total/Avail) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8672-21X[1] | 800[2] | 1/1 | 128 | 128MB/1.5GB | Rack (1U) | 1/1 | - | - | N | 2 x 10/100 | U160 | - | 0/72.8GB | 24X-10X | 4/2 | 2/1 |
| 8672-22X[1] | 800[2] | 1/1 | 128 | 128MB/1.5GB | Rack (1U) | 1/1 | - | - | N | 2 x 10/100 | IDE | - | 20.4GB/72.8GB | 24X-10X | 4/1 | 2/2 |
| 8672-23X[1, 5] | 800[2] | 1/1 | 128 | 128MB/1.5GB | Rack (1U) | 1/1 | - | - | N | 2 x 10/100 | U160 | - | 18.2GB/72.8GB | 24X-10X | 4/1 | 2/1 |
| 8672-81X[1] | 1GHz[3] | 1/1 | 256 | 256MB/1.5GB | Rack (1U) | 1/1 | - | - | N | 2 x 10/100 | U160 | - | 0/72.8GB | 24X-10X | 4/2 | 2/1 |
| 8672-82X[1] | 1GHz[3] | 1/1 | 256 | 256MB/1.5GB | Rack (1U) | 1/1 | - | - | N | 2 x 10/100 | IDE | - | 20.4GB/72.8GB | 24X-10X | 4/1 | 2/2 |
| 8672-83X[1, 5] | 1GHz[3] | 1/1 | 256 | 256MB/1.5GB | Rack (1U) | 1/1 | - | - | N | 2 x 10/100 | U160 | - | 18.2GB/72.8GB | 24X-10X | 4/1 | 2/1 |

1. Housed in a 19in rack-mountable drawer and ships standard without a keyboard or mouse. See Rack Cabinets and Options section for supported IBM racks.
2. Intel Celeron processor with 100MHz FSB. xSeries 300 does not support processor upgrades.
3. Intel Pentium III processor with advanced transfer L2 cache and 133MHz FSB. xSeries 300 does not support processor upgrades.
4. Variable read rate. Actual playback speed will vary and is often less than the maximum possible.
5. Not available in the United States.

## xSeries 300 Memory

| DIMM Socket |
|---|
| DIMM Socket |
| DIMM Socket |

| Part Number | Memory Description |
|---|---|
| 33L3081 | 128MB 133MHz ECC SDRAM DIMM Memory |
| 33L3083 | 256MB 133MHz ECC SDRAM DIMM Memory |
| 33L3085 | 512MB 133MHz ECC SDRAM Unbuffered DIMM Memory |

| Total System Memory (Standard Models)[1] | | DIMMs | | |
|---|---|---|---|---|
| 128MB (1 x 128) | 256MB (1 x 256) | 128MB (33L3081) | 256MB (33L3083) | 512MB (33L3085) |
| 256MB | 384MB | 1 | - | - |
| 384MB | 512MB | 2 | - | - |
| 512MB | 640MB | 1 | 1 | - |
| 640MB | 768MB | - | 2 | - |
| 896MB | 1024MB | - | 1 | 1 |
| 1152MB | 1280MB | - | - | 2 |
| 1536MB (max)[2] | 1536MB (max)[2] | - | - | 3 |

This table does not represent all possible memory configurations. Memory modules may vary in price per MB. Selection of smaller DIMMs may provide a more cost-effective alternative to using larger DIMMs. Select the desired total memory from the appropriate column (Standard 128MB or 256MB models), then add the quantities in that row from the DIMM columns.

1. Network operating systems may limit the maximum amount of addressable memory. See operating system specifications for further information.
2. Requires removal of standard DIMMs.

## xSeries 300 Hard Disk Drive (HDD) Storage

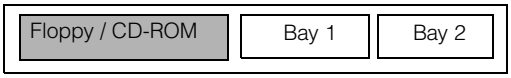
| Total Internal Storage[1] | 10,000RPM SCSI HDDs | | | 15,000RPM SCSI HDDs |
|---|---|---|---|---|
| | 9.1GB (00N8207) | 18.2GB (00N8208) | 36.4GB (00N8209) | 18.2GB (19K0658) |
| 0GB | Standard on some base models | | | |
| 18.2GB | - | (Std on some models) | - | 1 |
| 27.3GB | 1 | 1 | - | - |
| 36.4GB | - | 2 | - | 2 |
| 54.6GB | - | 1 | 1 | - |
| 72.8GB | - | - | 2 | - |

This table does not represent all possible HDD configurations.
1. Select a total storage row then add the quantity of HDDs from all columns in an RPM range. Total Internal Storage listed is within +/- 0.2GB unless otherwise noted.

| Total Internal Storage[1] | 7200RPM EIDE HDDs[2] | |
|---|---|---|
| | 20.4GB (P/N 19K4461) | 40GB (P/N 22P7157) |
| 20.4GB | (Std on EIDE models) | - |
| 40.8GB | 1 | - |
| 60.4GB | - | 1 |
| 80GB[3] | - | 2 |

This table does not represent all possible HDD configurations.Total Internal Storage listed is within +/-0.2GB unless otherwise noted.

1. Select a total storage row then add the quantity of HDDs from all columns to the standard HDD.
2. The xSeries 300 dual integrated EIDE controllers support a maximum of three IDE devices per machine including one CD-ROM and two IDE HDDs.
3. Requires removal of the standard HDD.




| Bay | Form Factor | Height | Front Access | Usage |
|---|---|---|---|---|
| 1[1] | 89mm (3.5in) | SL | Yes | HDD[2] |
| 2 | 89mm (3.5in) | SL | Yes | Open |

1. Boot drive should be located in bay 1.
2. SCSI models offered in the United States ship open bay.

| Part Number | Description | RPM | Height | Bays Supported | Max Qty |
|---|---|---|---|---|---|
| **IDE HDDs[1, 2]** | | | | | |
| 19K4461 | 20.4GB 7200rpm ATA-100 (EIDE) HDD | 7200 | SL | 1, 2 | 2 |
| 22P7157 | 40GB 7200rpm ATA-100 (EIDE) HDD | 7200 | SL | 1, 2 | 2 |
| **Ultra160 HDDs[2]** | | | | | |
| 00N8207 | 9.1GB 10,000rpm Ultra160 SCSI HDD | 10000 | SL | 1, 2 | 2 |
| 00N8208 | 18.2GB 10,000rpm Ultra160 SCSI HDD | 10000 | SL | 1, 2 | 2 |
| 00N8209 | 36.4GB 10,000rpm Ultra160 SCSI HDD | 10000 | SL | 1, 2 | 2 |
| 19K0658 | 18.2GB 15,000rpm Ultra160 SCSI HDD | 15000 | SL | 1, 2 | 2 |

| | External Storage Expansion Units[3] | Form Factor |
|---|---|---|
| 35311RU | Netfinity EXP300 Storage Expansion Unit[4] | Rack (3U) |
| 35601RU | Netfinity FAStT EXP500 Storage Expansion Unit[5] | Rack (3U) |
| 35421RU | FAStT200 Storage Server[6, 7] | Rack (3U) |
| 35422RU | FAStT200 HA Storage Server[6] | Rack (3U) |
| 19K1121 | FAStT200 Redundant RAID Controller | - |

1. The xSeries 300 dual integrated EIDE controllers support a maximum of three IDE devices per machine including one CD-ROM, and two IDE hard disk drives.
2. Mixing of IDE and SCSI hard disk drives is not supported.
3. xSeries 300 does not include an external SCSI connector. To configure a SCSI storage device, select an optional SCSI controller then refer to Appendix D: Cables - Storage Units - Controllers to confirm the controller supports the desired External Storage Expansion Unit and to select a supported cable. For HDD or other expansion unit options, see the specific expansion unit section. For Fibre Channel storage devices, refer to the Fibre Array Solutions section.
4. EXP300 includes a single 2M Ultra2 SCSI cable and dual hot-swap 500W redundant power supplies, each with its own power cord.
5. FAStT EXP500 Storage Expansion Unit (P/N 35601RU) includes dual hot-swap 350W power supplies, each with its own power cord.
6. The FAStT200 includes two hot-swap, 350W auto-ranging redundant power supplies, each with its own power cord.
7. Can be upgraded to FAStT200 HA Storage Server through the addition of a FAStT200 Redundant RAID Controller (P/N 19K1121).

## xSeries 300 Internal SCSI Cabling

### EIDE Configuration Cabling

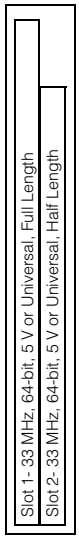
The xSeries 300 contains two integrated ATA-100 EIDE controllers. One controller is cabled directly to the 24x-10x IDE CD-ROM. xSeries 300 models that ship with a standard EIDE HDD use the second EIDE controller to attach the standard HDD. This controller supports up to two EIDE HDDs through the use of a two-drop cable.

### SCSI Configuration Cabling

xSeries 300 SCSI models contain a single channel, Ultra160 SCSI adapter. A two-drop, 16-bit LVD SCSI cable is attached to the internal connector of this adapter to support the standard Ultra160 HDD (model dependent). The second drop can be used to attach a second SCSI HDD. In configurations where external SCSI device attachment is required, a supported SCSI adapter or ServeRAID controller must be installed.

## xSeries 300 I/O Options

| Part Number | Description | Adapter Length | PCI Support[4] | Slots Supported[3, 4] |
|---|---|---|---|---|
| | **Storage Controllers[1, 2]** | | | |
| 37L6091 | ServeRAID-4L Ultra160 SCSI Controller[5] | Full | 64-bit | 1 |
| 37L6080 | ServeRAID-4M Ultra160 SCSI Controller[6] | Full | 64-bit | 1 |
| 06P5736 | ServeRAID-4Mx Ultra160 SCSI Controller[7] | Full | 64-bit | 1 |
| 06P5740 | ServeRAID-4Lx Ultra160 SCSI Controller[8] | Half | 64-bit | 1, 2 |
| 19K4646 | PCI Wide Ultra160 SCSI Adapter[9] | Half | 64-bit | 1, 2 |
| 02K3454 | PCI Fast/Wide Ultra SCSI Adapter[10] | Half | 32-bit | 1, 2 |
| | **Fibre Storage Controllers and Options[11]** | | | |
| 00N6881 | Netfinity FAStT Host Adapter | Half | 64-bit | 1, 2 |
| 35521RU | FAStT500 Storage Server | - | - | - |
| 35421RU | FAStT200 Storage Server | - | - | - |
| 35422RU | FAStT200 HA Storage Server | - | - | - |
| 35341RU | SAN Fibre Channel Managed Hub | - | - | - |
| 2109S08 | SAN Fibre Channel Switch, 8-Port | - | - | - |
| 2109S16 | SAN Fibre Channel Switch, 16-Port | - | - | - |
| 2108R3L | SAN Data Gateway Router Ultra SCSI LVD Port[12] | - | - | - |
| | **Networking[13]** | | | |
| | **Ethernet[14]** | | | |
| 09N9901 | 10/100 EtherLink Server Adapter by 3Com[15] | Half | 32-bit | 1, 2 |
| 06P3601 | 10/100 Ethernet Server Adapter[15] | Half | 32-bit | 1, 2 |
| 22P4901 | 10/100 Dual Port Server Adapter[15] | Half | 64-bit | 1, 2 |
| | **Token Ring** | | | |
| 34L5001 | 16/4 Token-Ring PCI Management Adapter[15] | Half | 32-bit | 1, 2 |
| 34L5201 | High-Speed 100/16/4 Token-Ring PCI Management Adapter[15] | Half | 32-bit | 1, 2 |
| | **Communications[16]** | | | |
| 33L4618 | V.90 PCI Data/Fax Modem | Half | 32-bit | 1, 2 |



Exterior Connector Access

1. xSeries 300 has dual inegrated EIDE (ATA-100) bus master controllers. SCSI models ship standard with a single-channel Ultra160 SCSI Controller in slot two. The SCSI controller includes a two-drop cable for connection to two internal HDDs. External connection of a SCSI device requires a supported SCSI adapter.
2. When both slots are populated by ServeRAID controllers, the boot media (internal HDD in bay one) must be attached to the controller in slot one.
3. Slot one only is available for SCSI models (Ultra160 SCSI Controller is installed in slot two). The external connector does not support external SCSI devices.
4. A 64-bit adapter installed into a 32-bit slot will transfer data at 32-bit rates. Adapters rated at 66MHz will operate at 33MHz when installed in a 33MHz slot.
5. ServeRAID-4L Ultra160 SCSI Controller is powered by a 100MHz Intel i960 processor and provides a single channel, 16MB of ECC cache and either one internal or one external Ultra160 connection. External connector is 0.8mm VHDCI.
6. ServeRAID-4M Ultra160 SCSI Controller is powered by a 100MHz Intel i960 processor and provides two channels, 64MB of battery-backed ECC cache and two external 0.8mm VHDCI Ultra160 connectors.
7. ServeRAID-4Mx Ultra160 SCSI Controller is powered by a 100MHz Intel Zion GC80303 processor that provides 64MB of battery-backed ECC cache and two internal and two external Ultra160 connections (only two connectors may be used). External connections are 0.8mm VHDCI.
8. ServeRAID-4Lx Ultra160 SCSI Controller is powered by a 100MHz Intel Zion GC80303 processor and provides a single channel, 32MB of ECC cache and either one internal or one external Ultra160 connection. External connector is 0.8mm VHDCI.
9. PCI Wide Ultra160 SCSI Adapter (P/N 19K4646) provides a single channel with one internal connector and one external 0.8mm VHDCI Ultra160 connector. Support for external SCSI devices only. A five-drop terminated LVD SCSI cable is included but not supported for use in this server.
10. PCI Fast/Wide Ultra SCSI Adapter (P/N 02K3454) provides one external 68-pin high density connector that supports external SCSI devices such as tape enclosures.
11. See the Fibre Array Solutions section for additional configuration information.
12. The 2108R3L SAN Data Gateway Router Ultra SCSI LVD port provides one integrated short-wave optical port and two SCSI ports for tape storage connections (LVD, HVD and single-ended).
13. xSeries 300 includes dual full-duplex, 10/100Mbps Ethernet controllers.
14. In a fault-tolerant networking environment, using the fault-tolerant software delivered with the Ethernet adapters of a single manufacturer is recommended. Installing fault-tolerant solutions provided by multiple manufacturers may cause failures if the intermediate drivers provided with the adapters are not compatible. The onboard Ethernet is Intel-based, which is compatible with the three Intel-based optional Ethernet adapters (P/N 06P3601, 06P3701, 22P4901).
15. Wake on LAN function provided with this networking adapter is supported by this server.
16. xSeries 300 includes two USB ports and a high speed serial/asynchronous port (NS16550A compatible).

## xSeries 300 Power, Monitors & Accessories

| Part Number | Description |
|---|---|
| | **Power[1]** |
| | **Uninterruptible Power Supply (UPS)[2]** |
| 94G6674 | APC Smart-UPS 1400RMB[3] |
| 94G6676 | APC Smart-UPS 3000RMB[3] |
| 37L6861 | APC Smart-UPS 5000RMB[4] |
| | **Monitors[5]** |
| 633347N | E51 Color Monitor 15in (350mm, 13.8in Viewable Image Size), stealth black[6] |
| 6331N2N | E54 Color Monitor 15in (350mm, 13.8in Viewable Image Size), stealth black[6] |
| 6332J1N | E74 Color Monitor 17in (403mm, 15.9in Viewable Image Size), stealth black[6] |
| 66274AN | G78 Color Monitor 17in (406.4mm, 16in Viewable Image Size), stealth black[6] |
| 9511AG4 | T540 Flat Panel Color Monitor 15in (381mm, 15in viewable image), stealth black[7] |

1. The xSeries 300 includes a worldwide, voltage sensing 200W power supply with auto restart and two 9ft line cords. One line cord contains a 110V NEMA 5-15P connector while the other contains an IEC 320 C14 for attachment to a high voltage PDU or UPS.
2. For runtimes and UPS attributes see Appendix C: UPS Runtime Estimate.
3. Height is 3U. See Rack Cabinets and Options section for supported IBM racks.
4. Height is 5U. See Rack Cabinets and Options section for supported IBM racks.
5. xSeries 300 uses an SVGA controller (S-3 Savage4 chipset) with 8MB of video memory.
6. Installation within a rack requires optional Monitor Compartment (P/N94G7444).
7. Installation within a rack requires optional Netfinity Flat Panel Monitor Rack Mount Kit II (P/N 37L6888) and Netfinity Rack Keyboard Tray (P/N 28L4707). A space saver keyboard may coexist within the same 28L4707 keyboard tray.

| Part Number | Description |
|---|---|
| | **Rack and NetBAY[1, 2]** |
| | Refer to the Rack Cabinets and Options section for information concerning IBM racks and rack-supported devices. |
| | **Keyboard and Mouse[3]** |
| 28L3644 | Space Saver II Keyboard[4, 5] |
| 28L3621 | Preferred Keyboard (stealth black)[6] |
| 01K1260 | TrackPoint IV 104-key Black Keyboard[5, 6] |
| 10K3849 | 106-key Preferred USB Keyboard with 2-port USB Hub (stealth black)[6] |
| 28L3673 | Sleek 2-button Stealth Black Mouse |
| 33L3244 | Sleek USB Mouse (stealth black) |

1. xSeries 300 is housed in a 19in rack-mountable drawer and requires one of the racks listed in the Rack Cabinets and Options section.
2. Note limitations and restrictions for adequate cooling in the Rack Cabinets and Options section. If non-IBM racks are to be used, assure that both the front and rear doors offer a minimum of 48% open area uniformly distributed and in line with installed servers. A clearance of 51 to 64mm (2 to 2.5in) must be maintained between the front door and the system unit's front bezel. The rear door must maintain the same or greater clearance.
3. xSeries 300 supports rack configurations only and ships without a keyboard or mouse.
4. Installation within a rack requires optional keyboard tray (P/N 28L4707), which stows in ready-to-use position.
5. Advanced TrackPoint IV features are not available on IBM xSeries or Netfinity systems.
6. Installation within a rack requires optional keyboard tray (P/N 28L4707). This keyboard cannot share a keyboard tray with a flat panel display.

## xSeries 300 Tape Options

| Part Number | Tape Drives | Bays Supported[1] | SCSI Interface (bit) | Form Factor | Termination Included | 68/50-pin Converter Incl | Ext Tape Enclosures |
|---|---|---|---|---|---|---|---|
| 09N4041 | 12/24GB DDS/3 4mm Internal SCSI Tape Drive | - | 8 | 89mm (3.5in) HH or 133mm (5.25in) HH | Y | Y | 3551001 |
| 09N4042 | 10/20GB NS Internal SCSI Tape Drive | - | 8 | 89mm (3.5in) SL or 133mm (5.25in) HH | Y | Y | 3551001 |
| 00N7991 | 20/40GB DDS/4 4mm Internal Tape Drive | - | 16 Ultra2 LVD | 89mm (3.5in) HH or 133mm (5.25in) HH | N | - | 3551001[2] |
| 24P2396 | 100/200GB LTO Half-High Tape Drive | - | 16 Ultra2 LVD | 133mm (5.25in) HH | N | - | 3551001[2] |
| | **External Tape Libraries[3]** | | | | | | |
| 3570C2x | Magstar MP 3570 Tape Subsystem | - | HVD | 6U Rack | Y | - | - |
| | **External Tape Enclosures** | | | | | | |
| 3551001 | NetMEDIA Storage Expansion Unit EL[4] | - | 16 | Rack | Y | N | - |
| 10L7113 | NetMEDIA Systems Management Adapter[5] | - | 16 LVD | - | N | N | 3551001 |
| | **Associated Options** | | | | | | |
| 10K2340 | Media BayTray and LVD Cable Kit[2] | - | 16 LVD | Int | Y | N | 3551001 |

1. xSeries 300 does not support internal tape drives and does not include an external SCSI connector. An external tape or internal tape with a tape enclosure, supported SCSI adapter and appropriate cable must be selected. All tape drives and enclosures are supported by PCI Wide Ultra160 SCSI Adapter (P/N 19K4646) which has an external 0.8mm VHDCI connector. Select tape drive, enclosure and supported adapter then use Appendix D: Cables - Storage Units - Controllers to select an appropriate external cable.
2. LVD support for LVD devices installed in a NetMEDIA Storage Expansion Unit EL (P/N 3551001) requires replacement of the standard single-ended internal cables with one or more (depending on configuration) cables from Media Bay Tray and LVD Cable Kit (P/N 10K2340) which contains a single two-drop multi-mode terminated cable. If the standard cables are used for attachment to LVD devices, single-ended SCSI rules and bus speeds apply.
3. Tape library attributes and prerequisites are located in Appendix B: Tape Library Attributes.
4. NetMEDIA Storage Expansion Unit EL (P/N 3551001) is a black 3U, 19in rack mountable tape enclosure which includes two full-high (FH) or four half-high (HH) extended length 133mm (5.25in) bays, two external 68-pin high density connectors and two internal four-drop single-ended terminated 16-bit SCSI cables for device attachment. Two power supplies and two power cords are also included. Tip: The front rail clips will need to be reversed and screwed in from behind to secure the unit in a 930842x rack.
45. NetMEDIA Systems Management Adapter (P/N 10L7113) may be installed in a 3551001 to provide repeater function, LVDS interface, aggregate cable lengths up to 12m when attached to an LVD SCSI controller, and auto-termination when the 3551001 is powered off. External connector is 0.8mm VHDCI.

Note: Additional tape attributes can be found in Appendix A: Tape Drive Attributes.

## xSeries 300 Sample Configurations

Note: The following sample configurations are for illustration only and may not be suitable for any specific customer installation. Contact your IBM Business Partner or IBM Marketing Representative for assistance with your specific configuration requirements.

### Internet Server[1]

| Part Number | Description | Quantity |
|---|---|---|
| 8672-81X | xSeries 300 1GHz/256KB Pentium III, 256MB ECC, Open, 24X | 1 |
| 00N8208 | 18.2GB 10,000rpm Ultra160 SCSI HDD | 2[2] |
| 9511AG4 | T540 Flat Panel Color Monitor 15in (381mm, 15in viewable image), stealth black | 1 |
| 28L3644 | Space Saver II Keyboard | 1 |
| 94G6674 | APC Smart-UPS 1400RMB | 1 |

1. This example shows a 19in rackable configuration. The rack components are not included.
2. For a total of 36.4GB of internal storage.

An Internet server handles all requests from the Internet (Intranet or Extranet). Usually, this type of server has the same characteristics as a normal file server. The main difference is that an Internet server talks a different language (TCP/IP vs. NETBEUI or IPX/SPX) and often needs to do an extra security check (firewall). In the case of an Internet server, the server itself talks mostly to one client, the Internet Service Provider (ISP), instead of many clients as a file server does.

With this is mind, the xSeries 300 was selected to provide an affordable price point for the growing Internet server market with Pentium III processing, 256MB of system memory (expandable to 1.5GB), and power protection with an APC Smart-UPS.

The network configuration depends on the method that will be used to connect the server to the Internet. Usually fast Ethernet routers are used, but if other methods are used you can add the appropriate adapter.

### File and Print Server[1]

| Part Number | Description | Quantity |
|---|---|---|
| 8672-21X | xSeries 300 800MHz/128MB Celeron, 128MB ECC, Open, 24X | 1 |
| 33L3083 | 256MB 133MHz ECC SDRAM DIMM Memory | 1[2] |
| 00N8209 | 36.4GB 10,000rpm Ultra160 SCSI HDD | 2[3] |
| 9511AG4 | T540 Flat Panel Color Monitor 15in (381mm, 15in viewable image), stealth black | 1 |
| 28L3644 | Space Saver II Keyboard | 1 |
| 94G6674 | APC Smart-UPS 1400RMB | 1 |

1. This example shows a 19in rackable configuration. The rack components are not included.
2. For a total of 384MB of system memory.
3. For a total of 72.8GB of internal storage.

A small business or departmental server is usually required to perform all typical server functions while servicing up to 100 users in a normal workgroup computing environment, but doesn't require the high-end performance and fault-tolerance properties of larger servers.

The sample configuration above consists of an xSeries 300 with 384MB of memory and 72.8GB of HDD space. It has enough processor power and memory to run most current network operating systems comfortably and enough HDD space to store a significant amount of data with additional external storage expansion still available. Demanding network traffic is effectively handled by the standard 100Mbps Ethernet connection.

This configuration also includes a UPS to keep the system protected during power surges and outages.

### Application Platform[1]

| Part Number | Description | Quantity |
|---|---|---|
| 8672-81X | xSeries 300 1GHz/256KB Pentium III, 256MB ECC, Open, 24X | 1 |
| 33L3085 | 512MB 133MHz ECC SDRAM Unbuffered DIMM Memory | 1[2] |
| 19K0658 | 18.2GB 15,000rpm Ultra160 SCSI HDD | 2[3] |
| 9511AG4 | T540 Flat Panel Color Monitor 15in (381mm, 15in viewable image), stealth black | 1 |
| 28L3644 | Space Saver II Keyboard | 1 |
| 94G6674 | APC Smart-UPS 1400RMB | 1 |

1. This example shows a 19in rackable configuration. The rack components are not included.
2. For a total of 768MB of system memory.
3. For a total of 36.4GB of internal storage.

An application server differs from a file and print server in that it has a higher workload in providing application serving requirements for users. As an appliance platform, this server efficiently delivers task-specific solutions using a single application, e.g., Web hosting, Web caching, firewalls or gateways. With this in mind, the xSeries 300 was selected to provide an affordable price point for an application server with Pentium III processing, 768MB of system memory (expandable to 1.5GB), and availability features such as RAID-protected internal storage and power protection with an APC Smart-UPS.

# IBM xSeries 330

## xSeries 330 At-A-Glance

| Part Number | Withdrawal Date[6] | Processor Speed (MHz)[2] | Number of Processors (Std/Max) | L2 ECC Cache (KB) | Memory (Std/Max) (R = RDIMM) | Form Factor | Power Supply Quantity (Std/Max) | Hot-Swap (Power, Slots, HDD, Fans) | Redundancy (Optional, Standard) | Adv System Management Processor | Onboard Ethernet (Mbps) | SCSI Controller (Dual, Ultra, RAID) | Removable Media Bays (Total/Avail) | Internal Hard Disk Drive (Std/Max) | CD-ROM (IDE)[5] | Bays (Total/Avail) | Slots (Total/Avail) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8654-31Y[1] | 31-Aug | 866[2] | 1/2 | 256 | 256MB(R)/4GB | Rack (1U) | 1/1 | H | - | Y | 2 x 10/100 | U160 | - | 0/146.8GB | 24X-10X | 4/2 | 2/2 |
| 8654-41Y[1] | - | 933[2] | 1/2 | 256 | 256MB(R)/4GB | Rack (1U) | 1/1 | H | - | Y | 2 x 10/100 | U160 | - | 0/146.8GB | 24X-10X | 4/2 | 2/2 |
| 8654-51Y[1] | - | 1GHz[2] | 1/2 | 256 | 256MB(R)/4GB | Rack (1U) | 1/1 | H | - | Y | 2 x 10/100 | U160 | - | 0/146.8GB | 24X-10X | 4/2 | 2/2 |
| 8674-11X[1] | - | 1.13GHz[3] | 1/2 | 512 | 256MB(R)/4GB | Rack (1U) | 1/1 | H | - | Y | 2 x 10/100 | U160 | - | 0/146.8GB | 24X-10X | 4/2 | 2/2 |
| 8674-12X[1] | - | 1.13GHz[3] | 1/2 | 512 | 256MB(R)/4GB | Rack (1U) | 1/1 | - | - | Y | 2 x 10/100 | IDE | - | 20.4GB/80GB | 24X-10X | 4/1 | 2/2 |
| 8674-13X[1] | - | 1.13GHz[3] | 1/2 | 512 | 256MB(R)/4GB | Rack (1U) | 1/1 | - | - | Y | 2 x 10/100 | U160 | - | 18.2GB/146.8GB[4] | 24X-10X | 4/1 | 2/2 |

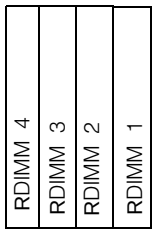
1. Housed in a 19in rack-mountable drawer and ships standard without a keyboard or mouse. See Rack Cabinets and Options section for supported IBM racks.
2. Intel Pentium III processor with advanced transfer L2 cache and 133MHz FSB. Cannot be upgraded with processor upgrades announced with models 11 … 13X.
3. Intel Pentium III 1.13GHz processor with133MHz FSB and 512KB advanced transfer cache. Compatible only with models 11 … 13X.
4. This model does not support hot-swap HDDs
5. Variable read rate. Actual playback speed will vary and is often less than the maximum possible.
6. Not available from IBM after this date. Business Partner inventory may be available.

## xSeries 330 Processors

| Part Number | Processor Upgrades | SMP Support[1] | Processor Speed Upgrade[2] |
|---|---|---|---|
| 10K3806 | 866MHz Upgrade with 133MHz FSB and 256KB Advanced Transfer Cache Pentium III Processor | 31Y | - |
| 10K0052 | 933MHz Upgrade with 133MHz FSB and 256KB Advanced Transfer Cache Pentium III Processor | 41Y | 31Y |
| 10K0053 | 1GHz Upgrade with 133MHz FSB and 256KB Advanced Transfer Cache Pentium III Processor | 51Y | 31Y, 41Y |
| 25P2835 | xSeries 1.13GHz Upgrade with 133MHz FSB and 512KB Advanced Transfer Cache Pentium III Processor | 11 … 13X | - |

1. One additional processor may be installed, providing a maximum of two. All processors must be identical in type, speed, and cache size.
2. Requires removal of the standard processor. A maximum of two processors may be installed. All processors must be identical in type, speed and cache size. Upgrades may require a BIOS update. To obtain the latest Flash BIOS, access www.pc.ibm.com/support and enter machine "Type-Model" in Quick Path. Select "Downloadable files" then "BIOS."

## xSeries 330 Memory




| Part Number | Memory Description[1] |
|---|---|
| 33L3142 | 128MB, 133MHz SDRAM ECC RDIMM |
| 33L3144 | 256MB, 133MHz SDRAM ECC RDIMM |
| 33L3146 | 512MB, 133MHz SDRAM ECC RDIMM |
| 33L3152 | 1GB, 133MHz SDRAM ECC RDIMM |
| 10K0018 | IBM 128MB PC133 ECC SDRAM RDIMM |
| 10K0020 | IBM 256MB PC133 ECC SDRAM RDIMM |
| 10K0022 | IBM 512MB PC133 ECC SDRAM RDIMM |
| 33L3326 | IBM 1GB PC133 ECC SDRAM RDIMM |

1. Memory RDIMMs must be installed in sequence from RDIMM connector 1 through connector 4. RDIMM size is not relevant.

| Total Memory[1] | Quantity of RDIMMs Added | | | |
|---|---|---|---|---|
| 256MB (1 x 256) Models | 128MB 33L3142 or 10K0018 | 256MB 33L3144 or 10K0020 | 512MB 33L3146 or 10K0022 | 1GB 33L3152 or 33L3326 |
| 384MB | 1 | - | - | - |
| 512MB | 2 or | 1 | - | - |
| 640MB | 3 | - | - | - |
| 768MB | - | 2 or | 1 | - |
| 1024MB | - | 3 | - | - |
| 1280MB | - | - | 2 or | 1 |
| 1792MB | - | - | 3 | - |
| 2048MB | - | - | 4[2] | - |
| 2304MB | - | - | - | 2 |
| 3328MB | - | - | - | 3 |
| 4096MB (max) | - | - | - | 4[2] |

This table does not represent all possible memory configurations. Memory modules may vary in price per MB. Selection of smaller RDIMMs may provide a more cost-effective alternative to using larger RDIMMs.

1. Network operating systems may limit the maximum amount of addressable memory. See operating system specifications for further information.
2. Requires removal of standard memory.

## xSeries 330 Hard Disk Drive (HDD) Storage

| SCSI Models | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Total Int Storage[1] | 7200RPM HDDs | | | 10,000RPM HDDs | | | | 15,000RPM HDDs | |
| | 9.1GB (37L7201) | 18.2GB (37L7202) | 36.4GB (37L7203) | 9.1GB (37L7204, 00N8207) | 18.2GB (37L7205, 00N8208) | 36.4GB (37L7206, 00N8209) | 73.4GB (06P5752, 06P5756) | 9.1GB (19K0655) | 18.2GB (19K0656, 19K0658) |
| 0GB | Standard on some base models | | | | | | | | |
| 9.1GB | 1 | - | - | 1 | - | - | - | 1 | - |
| 18.2GB[2] | 2 | - | - | - | 1[2] | - | - | 2 | - |
| 36.4GB | - | 2 | - | - | - | 1 | - | - | 2 |
| 72.8GB | - | - | 2 | - | - | 2 | - | - | - |
| 73.4GB | - | - | - | - | - | - | 1 | - | - |
| 146.8GB (max)[3] | - | - | - | - | - | - | 2 | - | - |

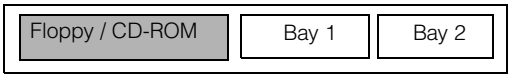
This table does not represent all possible HDD configurations.

1. Select a total storage row then add the quantity of HDDs from all columns within an RPM range. Total Internal Storage listed is within +/- 0.2GB unless otherwise noted.
2. Some SCSI models support only nonhot-swap HDDs. Model 8674-13X ships standard with one 18.2GB fixed disk HDD (P/N 00N8208).
3. Requires replacing standard HDD in nonhot-swap SCSI models.

| IDE Models | | |
|---|---|---|
| Total Internal Storage[1] | 7200RPM HDDs[2] | |
| | 20.4GB (P/N 19K4461) | 40GB (P/N 22P7157) |
| 20.4GB | (Std on EIDE models) | - |
| 40.8GB | 1 | - |
| 60.4GB | - | 1 |
| 80GB[3] | - | 2 |

This table does not represent all possible HDD configurations. Total Internal Storage listed is within +/-0.2GB unless otherwise noted.

1. Select a total storage row then add the quantity of HDDs from all columns to the standard HDD.
2. The xSeries 330 dual integrated EIDE controllers support a maximum of three IDE devices per machine including one CD-ROM and two IDE HDDs.
3. Requires removal of the standard HDD.




| Bay | Form Factor | Height | Front Access | Usage |
|---|---|---|---|---|
| 1[1] | HS or 89mm (3.5in)[2] | SL | Yes | Open[3] |
| 2 | HS or 89mm (3.5in)[2] | SL | Yes | Open[3] |

1. Boot drive should be located in bay 1.
2. x330 now includes IDE, fixed disk and hot-swap models.
3. Fixed disk and IDE models ship with one standard HDD.

| Part Number | Description | RPM | Height | Bays Supported | Max Qty |
|---|---|---|---|---|---|
| | **IDE HDDs[1, 2]** | | | | |
| 19K4461 | 20.4GB 7200rpm ATA-100 (EIDE) HDD | 7200 | SL | 1 … 2 | 2 |
| 22P7157 | 40GB 7200rpm ATA-100 (EIDE) HDD | 7200 | SL | 1 … 2 | 2 |
| | **Nonhot-swap Ultra160 HDDs[2, 3]** | | | | |
| 00N8207 | 9.1GB 10,000rpm Ultra160 SCSI HDD | 10000 | SL | 1 … 2 | 2 |
| 00N8208 | 18.2GB 10,000rpm Ultra160 SCSI HDD | 10000 | SL | 1 … 2 | 2 |
| 00N8209 | 36.4GB 10,000rpm Ultra160 SCSI HDD | 10000 | SL | 1 … 2 | 2 |
| 19K0658 | 18.2GB 15,000rpm Ultra160 SCSI HDD | 15000 | SL | 1 … 2 | 2 |
| 06P5752 | 73.4GB 10Krpm Ultra160 SCSI SL HDD | 10000 | SL | 1 … 2 | 2 |
| | **Hot-swap Ultra 160HDDs[4]** | | | | |
| 37L7201 | 9.1GB Ultra160 SCSI Hot-Swap SL HDD | 7200 | SL | 1 … 2 | 2 |
| 37L7202 | 18.2GB Ultra160 SCSI Hot-Swap SL HDD | 7200 | SL | 1 … 2 | 2 |
| 37L7203 | 36.4GB Ultra160 SCSI Hot-Swap SL HDD | 7200 | SL | 1 … 2 | 2 |
| 37L7204 | 9.1GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD | 10000 | SL | 1 … 2 | 2 |
| 37L7205 | 18.2GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD | 10000 | SL | 1 … 2 | 2 |
| 37L7206 | 36.4GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD | 10000 | SL | 1 … 2 | 2 |
| 19K0655 | 9.1GB 15Krpm Ultra160 SCSI Hot-Swap HDD | 15000 | SL | 1 … 2 | 2 |
| 19K0656 | 18.2GB 15Krpm Ultra160 SCSI Hot-Swap HDD | 15000 | SL | 1 … 2 | 2 |
| 06P5756 | 73.4GB 10Krpm Ultra160 SCSI Hot-Swap SL HDD | 10000 | SL | 1 … 2 | 2 |

| | **External Storage Expansion Units[5]** | **Form Factor** |
|---|---|---|
| 35311RU | Netfinity EXP300 Storage Expansion Unit[6] | Rack (3U) |
| 35601RU | Netfinity FAStT EXP500 Storage Expansion Unit[7] | Rack (3U) |
| 35421RU | FAStT200 Storage Server[8, 9] | Rack (3U) |
| 35422RU | FAStT200 HA Storage Server[8] | Rack (3U) |
| 19K1121 | FAStT200 Redundant RAID Controller | - |

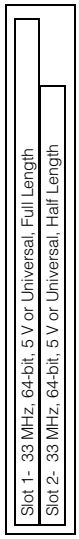
1. The xSeries 330 dual integrated EIDE controllers support a maximum of three IDE devices per machine including one CD-ROM and two IDE hard disk drives. IDE HDDs are supported only on IDE models.
2. Mixing of IDE and SCSI hard disk drives is not supported.
3. Nonhot-swap HDDs are supported only in fixed disk models.
4. Hot-swap HDDs are supported only in hot-swap models.
5. xSeries 330 does not include an external SCSI connector. To configure a SCSI storage device, select an optional SCSI controller then refer to Appendix D: Cables - Storage Units - Controllers to confirm the controller supports the desired External Storage Expansion Unit and to select a supported cable. For HDD or other expansion unit options, see the specific expansion unit section. For Fibre Channel storage devices, refer to the Fibre Array Solutions section.
6. EXP300 includes a single 2M Ultra2 SCSI cable and dual hot-swap 500W redundant power supplies, each with its own power cord.
7. FAStT EXP500 Storage Expansion Unit (P/N 35601RU) includes dual hot-swap 350W power supplies, each with its own power cord.
8. The FAStT200 includes two hot-swap, 350W auto-ranging redundant power supplies, each with its own power cord.
9. Can be upgraded to FAStT200 HA Storage Server through the addition of a FAStT200 Redundant RAID Controller (P/N 19K1121).

## xSeries 330 Internal SCSI Cabling

xSeries 330 contains a DASD backplane supporting two hot-swap, SCA-2 compliant drive bays. The backplane is connected to one of the internal connectors of the integrated Ultra160 SCSI controller through a 16-bit LVD SCSI cable. If internal RAID is required, the cable can be attached to the internal connector of the optional RAID adapter. The cable is of sufficient length to attach to adapters in slot one but not slot two.
In configurations where external SCSI device attachment is required, a supported SCSI adapter or ServeRAID controller must be installed.

## xSeries 330 I/O Options

| Part Number | Description | Adapter Length | PCI Support[17] | Slots Supported[17] |
|---|---|---|---|---|
| | **Storage Controllers[1, 2]** | | | |
| 37L6091 | ServeRAID-4L Ultra160 SCSI Controller[3] | Full | 64-bit | 1 |
| 37L6080 | ServeRAID-4M Ultra160 SCSI Controller[4] | Full | 64-bit | 1 |
| 37L6889 | ServeRAID-4H Ultra160 SCSI Controller[5] | Full | 64-bit | 1 |
| 06P5736 | ServeRAID-4Mx Ultra160 SCSI Controller[6] | Full | 64-bit | 1 |
| 06P5740 | ServeRAID-4Lx Ultra160 SCSI Controller[7] | Half | 64-bit | 1, 2 |
| 19K4646 | PCI Wide Ultra160 SCSI Adapter[8] | Half | 64-bit | 1, 2 |
| | **Fibre Storage Controllers and Options[9]** | | | |
| 00N6881 | Netfinity FAStT Host Adapter | Half | 64-bit | 1, 2 |
| 35521RU | FAStT500 Storage Server | - | - | - |
| 35421RU | FAStT200 Storage Server | - | - | - |
| 35422RU | FAStT200 HA Storage Server | - | - | - |
| 35341RU | SAN Fibre Channel Managed Hub | - | - | - |
| 2109S08 | SAN Fibre Channel Switch, 8-Port | - | - | - |
| 2109S16 | SAN Fibre Channel Switch, 16-Port | - | - | - |
| 2108R3L | SAN Data Gateway Router Ultra SCSI LVD Port[10] | - | - | - |
| | **Networking[11]** | | | |
| | **Ethernet[12]** | | | |
| 19K4401 | Netfinity Gigabit Ethernet Adapter (copper) | Half | 64-bit | 1, 2 |
| 09N9901 | 10/100 EtherLink Server Adapter by 3Com[13] | Half | 32-bit | 1, 2 |
| 06P3601 | 10/100 Ethernet Server Adapter[13] | Half | 32-bit | 1, 2 |
| 06P3701 | Gigabit Ethernet SX Server Adapter (fiber) | Half | 64-bit | 1, 2 |
| | **Token Ring** | | | |
| 34L0701 | Token-Ring 16/4 PCI Adapter2 with Wake on LAN[13] | Half | 32-bit | 1, 2 |
| 34L5001 | 16/4 Token-Ring PCI Management Adapter[13] | Half | 32-bit | 1, 2 |
| 34L5201 | High-Speed 100/16/4 Token-Ring PCI Management Adapter[13] | Half | 32-bit | 1, 2 |
| | **Communications[14]** | | | |
| 33L4618 | V.90 PCI Data/Fax Modem | Half | 32-bit | 1, 2 |
| 37L14xx | Serial I/O SST 8, 16 and 128 port adapters[15] | Half | 32-bit | 1, 2 |
| | **Systems Management[16]** | | | |
| 01K7209 | Netfinity Advanced System Management PCI Adapter | Full | 32-bit | 1 |
| 03K9309 | Netfinity Advanced System Management Interconnect Cable Kit | - | - | - |
| 36L9654 | Netfinity Advanced System Management Token-Ring Connection | - | - | - |
| 09N7585 | Remote Supervisor Adapter | Half | 32-bit | 1 |



Exterior Connector Access

1. xSeries 330 has an integrated single channel Ultra160 SCSI Controller.
2. When both slots are populated by ServeRAID controllers, the boot media (internal HDD in bay one) must be attached to the controller in slot one.
3. ServeRAID-4L Ultra160 SCSI Controller is powered by a 100MHz Intel i960 processor and provides a single channel, 16MB of ECC cache and either one internal or one external Ultra160 connection. External connector is 0.8mm VHDCI.
4. ServeRAID-4M Ultra160 SCSI Controller is powered by a 100MHz Intel i960 processor and provides two channels, 64MB of battery-backed ECC cache and two external 0.8mm VHDCI Ultra160 connectors.
5. ServeRAID-4H Ultra160 SCSI Controller is powered by a 266MHz Power PC 750 processor and provides 128MB of battery-backed ECC cache. The internal connectors are not accessible due to a cabling interference. Four external Ultra160 0.8mm VHDCI connectors are available.

6. ServeRAID-4Mx Ultra160 SCSI Controller is powered by a 100MHz Intel Zion GC80303 processor that provides 64MB of battery-backed ECC cache and two internal and two external Ultra160 connections (only two connectors may be used). External connections are 0.8mm VHDCI.
7. ServeRAID-4Lx Ultra160 SCSI Controller is powered by a 100MHz Intel Zion GC80303 processor and provides a single channel, 32MB of ECC cache and either one internal or one external Ultra160 connection. External connector is 0.8mm VHDCI.
8. PCI Wide Ultra160 SCSI Adapter (P/N 19K4646) provides a single channel with one internal connector and one external 0.8mm VHDCI Ultra160 connector. Support for external SCSI devices only. A five-drop terminated LVD SCSI cable is included but not supported for use in this server.
9. See the Fibre Array Solutions section for additional configuration information.
10. The 2108R3L SAN Data Gateway Router Ultra SCSI LVD port provides one integrated short-wave optical port and two SCSI ports for tape storage connections (LVD, HVD and single-ended).
11. xSeries 330 includes dual full-duplex, 10/100Mbps Ethernet controllers.
12. In a fault-tolerant networking environment, using the fault-tolerant software delivered with the Ethernet adapters of a single manufacturer is recommended. Installing fault-tolerant solutions provided by multiple manufacturers may cause failures if the intermediate drivers provided with the adapters are not compatible. The onboard Ethernet is Intel-based, which is compatible with the two Intel-based optional Ethernet adapters (P/N 06P3601, 06P3701).
13. The Wake on LAN function of this option is not supported by models with machine type 8654. Models with machine type 8674 support Wake on LAN.
14. xSeries 330 includes two USB ports and a high speed serial/asynchronous port (NS16550A compatible).
15. See Appendix E for details on Serial I/O Options and configuration limitations.
16. xSeries 330 has a single integrated system management port and a single RS485 port.
17. A 64-bit adapter installed into a 32-bit slot will transfer data at 32-bit rates. Adapters rated at 66MHz will operate at 33MHz when installed in a 33MHz slot.

## xSeries 330 Power, Monitors & Accessories

| Part Number | Description |
|---|---|
| | **Power[1]** |
| | **Uninterruptible Power Supply (UPS)[2]** |
| 94G6674 | APC Smart-UPS 1400RMB[3] |
| 94G6676 | APC Smart-UPS 3000RMB[3] |
| 37L6861 | APC Smart-UPS 5000RMB[4] |
| | **Monitors[5]** |
| 06P4792 | Cable Chain Technology Cable Kit[6] |
| 633347N | E51 Color Monitor 15in (350mm, 13.8in Viewable Image Size), stealth black[7] |
| 6331N2N | E54 Color Monitor 15in (350mm, 13.8in Viewable Image Size), stealth black[7] |
| 6332J1N | E74 Color Monitor 17in (403mm, 15.9in Viewable Image Size), stealth black[7] |
| 66274AN | G78 Color Monitor 17in (406.4mm, 16in Viewable Image Size), stealth black[7] |
| 9511AG4 | T540 Flat Panel Color Monitor 15in (381mm, 15in viewable image), stealth black[8] |

1. The xSeries 330 includes a worldwide, voltage sensing 200W power supply and two 9ft line cords. One line cord contains a 110V NEMA 5-15P connector while the other contains an IEC 320 C14 for attachment to a high voltage PDU or UPS.
2. For runtimes and UPS attributes see Appendix C: UPS Runtime Estimate.
3. Height is 3U. See Rack Cabinets and Options section for supported IBM racks.
4. Height is 5U. See Rack Cabinets and Options section for supported IBM racks.
5. xSeries 330 uses an SVGA controller (S-3 Savage4 chipset) with 8MB of video memory.
6. A Cable Chain Technology (C2T) Cable Kit (P/N 06P4792) is required for the attachment of console devices to one or multiple chained xSeries 330s. The kit contains a 2M (6.5ft) breakout cable for attachment to a keyboard. mouse and monitor as well as a 2M (6.5ft) chaining cable for connecting two xSeries 330s together when the standard 260mm (10in) chaining cable is not long enough. A maximum of 42 xSeries 330s are supported in a single chain. No more than one C2T Cable kit may be used. If the last server in the chain is connected to a console switch rather than directly to a monitor, a console cable (P/N 09N4293 or 94G7447) is required in addition to the C2T Kit.
7. Installation within a rack requires optional Monitor Compartment (P/N94G7444).
8. Installation within a rack requires optional Netfinity Flat Panel Monitor Rack Mount Kit II (P/N 37L6888) and Netfinity Rack Keyboard Tray (P/N 28L4707). A space saver keyboard may coexist within the same 28L4707 keyboard tray.

| Part Number | Description |
|---|---|
| | **Rack and NetBAY[1, 2]** |
| | Refer to the Rack Cabinets and Options section for information concerning IBM racks and rack-supported devices. |
| | **Keyboard and Mouse[3]** |
| 06P4792 | Cable Chain Technology Cable Kit[4] |
| 28L3644 | Space Saver II Keyboard[5, 6] |
| 01K1260 | TrackPoint iV 104-key Black Keyboard[6, 7] |
| 28L3621 | Preferred Keyboard (stealth black)[7] |
| 28L3673 | Sleek 2-button Stealth Black Mouse |
| 33L3244 | Sleek USB Mouse (stealth black) |

1. xSeries 330 is housed in a 19in rack-mountable drawer and requires one of the racks listed in the Rack Cabinets and Options section.
2. Note limitations and restrictions for adequate cooling in the Rack Cabinets and Options section. If non-IBM racks are to be used, assure that both the front and rear doors offer a minimum of 48% open area uniformly distributed and in line with installed servers. A clearance of 51 to 64mm (2 to 2.5in) must be maintained between the front door and the system unit's front bezel. The rear door must maintain the same or greater clearance.
3. xSeries 330 supports rack configurations only and ships without a keyboard or mouse.
4. A Cable Chain Technology (C2T) Cable Kit (P/N 06P4792) is required for the attachment of console devices to one or multiple chained xSeries 330s. The kit contains a 2M (6.5ft) breakout cable for attachment to a keyboard. mouse and monitor as well as a 2M (6.5ft) chaining cable for connecting two xSeries 330s together when the standard 260mm (10in) chaining cable is not long enough. A maximum of 42 xSeries 330s are supported in a single chain. No more than one C2T Cable kit may be used. If the last server in the chain is connected to a console switch rather than directly to a monitor, a console cable (P/N 09N4293 or 94G7447) is required in addition to the C2T Kit.
5. Installation within a rack requires optional keyboard tray (P/N 28L4707), which stows in ready-to-use position.
6. Advanced TrackPoint IV features are not available on IBM xSeries or Netfinity systems.
7. Installation within a rack requires optional keyboard tray (P/N 28L4707). This keyboard cannot share a keyboard tray with a flat panel display.

## xSeries 330 Tape Options

| Part Number | Tape Drives | Bays Supported[1] | SCSI Interface (bit) | Form Factor | Termination Included | 68/50-pin Converter Incl | Ext Tape Enclosures |
|---|---|---|---|---|---|---|---|
| 09N4041 | 12/24GB DDS/3 4mm Internal SCSI Tape Drive | - | 8 | 89mm (3.5in) HH or 133mm (5.25in) HH | Y | Y | 3551001 |
| 09N4042 | 10/20GB NS Internal SCSI Tape Drive | - | 8 | 89mm (3.5in) SL or 133mm (5.25in) HH | Y | Y | 3551001 |
| 00N7991 | 20/40GB DDS/4 4mm Internal Tape Drive | - | 16 Ultra2 LVD | 89mm (3.5in) HH or 133mm (5.25in) HH | N | - | 3551001[2] |
| 09N4040 | 20/40GB DLT Internal SCSI Tape Drive | - | 8 | 133mm (5.25in) FH | N | Y | 3551001<br>3503B0X[3] |
| 00N7990 | 40/80GB DLT Internal SCSI Tape Drive | - | 16 Ultra2 LVD | 133mm (5.25in) FH | N | - | 3551001[2]<br>3503B0X[3] |
| 00N8017 | 60/120GB 8mm M2 SCSI Tape Drive | - | 16 Ultra2 LVD | 133mm (5.25in) HH | N | - | 3551001[2] |
| 00N8016 | 100/200GB LTO Tape Drive | - | 16 Ultra2 LVD | 133mm (5.25in) FH | N | - | 3551001[2] |
| 24P2396 | 100/200GB LTO Half-High Tape Drive | - | 16 Ultra2 LVD | 133mm (5.25in) HH | N | - | 3551001[2] |
| 24P2398 | 40/80GB Half-High DLTVS Internal SCSI Tape Drive | - | 16 Ultra2 LVD | 133mm (5.25in) HH | N | - | 3551001[2] |
| | **Tape Autoloaders** | | | | | | |
| 00N7992 | 120/240GB DDS/4 Tape Autoloader | - | 16 Ultra2 LVD | 133mm (5.25in) FH | N | - | 3551001[2] |
| 3600109 | 3600 Series 900GB/1.8TB LTO Tape Autoloader[4] | - | 16 Ultra2 LVD | Tower or 6U Rack | Y | - | - |
| | **External Tape Libraries[5]** | | | | | | |
| 3502R14 | DLT Tape Library | - | 16 | Rack | Y | - | - |
| 3570C2X | Magstar MP 3570 Tape Subsystem | - | HVD | 6U Rack | Y | - | - |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 3600220 | 3600 Series 2/4TB LTO Tape Library (Tower) | - | 16 Ultra2 LVD | Tower | Y | - | - |
| 3600R20 | 3600 Series 2/4TB LTO Tape Library (Rack) | - | 16 Ultra2 LVD | 5U Rack | Y | - | - |
| 09N4048 | 3600 Series LTO Drive Upgrade Option[6] | - | 16 Ultra2 LVD | - | N | - | - |
| | **External Tape Enclosures** | | | | | | |
| 3551001 | NetMEDIA Storage Expansion Unit EL[7] | - | 16 | Rack | Y | N | - |
| 10L7113 | NetMEDIA Systems Management Adapter[8] | - | 16 LVD | - | N | N | 3551001 |
| 3503B0X | DLT External SCSI Enclosure[9] | | 16 | Desktop | N | N | - |
| | **Associated Options** | | | | | | |
| 10K2340 | Media Bay Tray and LVD Cable Kit[2] | - | 16 LVD | Int | Y | N | 3551001 |
| 00N7956 | 68-pin External Multimode LVD/SE SCSI Terminator | - | 16 LVD/SE | Ext | Y | N | 3503B0X |

1. xSeries 330 does not support internal tape drives and does not include an external SCSI connector. An external tape or internal tape with a tape enclosure, supported SCSI adapter and appropriate cable must be selected. All tape drives and enclosures are supported by PCI Wide Ultra160 SCSI Adapter (P/N 19K4646) which has an external 0.8mm VHDCI connector. Select tape drive, enclosure and supported adapter then use Appendix D: Cables - Storage Units - Controllers to select an appropriate external cable.
2. LVD support for LVD devices installed in a NetMEDIA Storage Expansion Unit EL (P/N 3551001) requires replacement of the standard single-ended internal cables with one or more (depending on configuration) cables from Media Bay Tray and LVD Cable Kit (P/N 10K2340) which contains a single two-drop multi-mode terminated cable. If the standard cables are used for attachment to LVD devices, single-ended SCSI rules and bus speeds apply.
3. Requires 68-pin External Multimode LVD/SE SCSI Terminator (P/N 00N7956).
4. If installed in a rack, a fixed shelf is required. Allow an additional 1U for the fixed shelf. One unit only per shelf is supported.
5. Tape library attributes and prerequisites are located in Appendix B: Tape Library Attributes.
6. Install in second drive bay of 3600 Series LTO Tape Libraries or in either of the two bays of 3600 Series 2-Drive 20-Cartridge Expander Module to increase performance. Includes an LTO (Ultrium) drive and a one-meter external LVD SCSI cable.
7. NetMEDIA Storage Expansion Unit EL (P/N 3551001) is a black 3U, 19in rack mountable tape enclosure which includes two full-high (FH) or four half-high (HH) extended length 133mm (5.25in) bays, two external 68-pin high density connectors and two internal four-drop single-ended terminated 16-bit SCSI cables for device attachment. Two power supplies and two power cords are also included. Tip: The front rail clips will need to be reversed and screwed in from behind to secure the unit in a 930842x rack.
8. NetMEDIA Systems Management Adapter (P/N 10L7113) may be installed in a 3551001 to provide repeater function, LVDS interface, aggregate cable lengths up to 12m when attached to an LVD SCSI controller, and auto-termination when the 3551001 is powered off. External connector is 0.8mm VHDCI.
9. Provides a black desktop DLT tape enclosure with a 68-pin high density external connector. Requires termination by the tape drive or by installation of an External Multimode LVD/SE SCSI terminator (P/N 00N7956).

Note: Additional tape attributes can be found in Appendix A: Tape Drive Attributes.

## xSeries 330 Sample Configurations

Note: The following sample configurations are for illustration only and may not be suitable for any specific customer installation. Contact your IBM Business Partner or IBM Marketing Representative for assistance with your specific configuration requirements.

### Internet Server[1]

| Part Number | Description | Quantity |
|---|---|---|
| 8654-41Y | xSeries 330 (Pentium III 933/256MB/0GB) | 1 |
| 37L7205 | 18.2GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD | 2[2] |
| 06P4792 | Cable Chain Technology Cable Kit | 1[3] |
| 6331N2N | E54 Color Monitor 15in (350mm, 13.8in Viewable Image Size), stealth black | 1 |
| 28L3644 | Space Saver II Keyboard | 1 |
| 94G6674 | APC Smart-UPS 1400RMB | 1 |

1. This example shows a 19in rackable configuration. The rack components are not included.
2. For a total of 36.4GB of internal storage.
3. A single Cable Chain Technology Cable Kit (P/N 06P4792) is required for attachment of one or multiple (up to 42) chained xSeries 330s to a single monitor, mouse and keyboard.

An Internet server handles all requests from the Internet (Intranet or Extranet). Usually, this type of server has the same characteristics as a normal file server. The main difference is that an Internet server talks a different language (TCP/IP vs. NETBEUI or IPX/SPX) and often needs to do an extra security check (firewall). In the case of an Internet server, the server itself talks mostly to one client, the Internet Service Provider (ISP), instead of many clients as a file server does.

With this is mind, the xSeries 330 was selected to provide an affordable price point for the growing Internet server market with two-way Pentium III processing, 256MB of system memory (expandable to 4GB), and power protection with an APC Smart-UPS.

The network configuration depends on the method that will be used to connect the server to the Internet. Usually fast Ethernet routers are used, but if other methods are used you can add the appropriate adapter.

### File and Print Server[1]

| Part Number | Description | Quantity |
|---|---|---|
| 8654-11Y | xSeries 330 800MHz/256KB, 256MB ECC, OPEN, 24X, PCI | 1 |
| 33L3142 | xSeries 128MB 133MHz ECC SDRAM RDIMM | 1[2] |
| 37L7206 | 36.4GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD | 2[3] |
| 06P4792 | Cable Chain Technology Cable Kit | 1[4] |
| 6331N2N | E54 Color Monitor 15in (350mm, 13.8in Viewable Image Size), stealth black | 1 |
| 28L3644 | Space Saver II Keyboard | 1 |
| 94G6674 | APC Smart-UPS 1400RMB | 1 |

1. This example shows a 19in rackable configuration. The rack components are not included.
2. For a total of 384MB of system memory.
3. For a total of 72.8GB of internal storage.
4. A single Cable Chain Technology Cable Kit (P/N 06P4792) is required for attachment of one or multiple (up to 42) chained xSeries 330s to a single monitor, mouse and keyboard.

A small business or departmental server is usually required to perform all typical server functions while servicing up to 100 users in a normal workgroup computing environment, but doesn't require the high-end performance and fault-tolerance properties of larger servers.

The sample configuration above consists of an xSeries 330 with 384MB of memory and 72.8GB of HDD space. It has enough processor power and memory to run most current network operating systems comfortably and enough HDD space to store a significant amount of data with additional external storage expansion still available. Demanding network traffic is effectively handled by the standard 100Mbps Ethernet connection.

This configuration also includes a UPS to keep the system protected during power surges and outages.

**Application Server[1]**

| Part Number | Description | Quantity |
|---|---|---|
| 8654-51Y | xSeries 330 1GHz/256KB, 256MB ECC, OPEN, 24X, PCI | 1 |
| 10K0053 | 1GHz Upgrade with 133MHz FSB and 256KB Advanced Transfer Cache Pentium III Processor | 1 |
| 33L3144 | xSeries 256MB 133MHz ECC SDRAM RDIMM | 1[2] |
| 37L7205 | 18.2GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD | 2[3] |
| 06P4792 | Cable Chain Technology Cable Kit | 1[4] |
| 6331N2N | E54 Color Monitor 15in (350mm, 13.8in Viewable Image Size), stealth black | 1 |
| 28L3644 | Space Saver II Keyboard | 1 |
| 94G6674 | APC Smart-UPS 1400RMB | 1 |

1. This example shows a 19in rackable configuration. The rack components are not included.
2. For a total of 512MB of system memory.
3. For a total of 36.4GB of internal storage.
4. A single Cable Chain Technology Cable Kit (P/N 06P4792) is required for attachment of one or multiple (up to 42) chained xSeries 330s to a single monitor, mouse and keyboard.

An application server differs from a file and print server in that it has a higher workload in providing application serving requirements for users. With this in mind, the xSeries 330 was selected to provide an affordable price point for an application server with two-way Pentium III processing, 512MB of system memory (expandable to 4GB), power protection with an APC Smart-UPS, and optional availability features such as RAID-protected internal storage.

# IBM xSeries 340 and Netfinity 4500R

| Part Number | Processor Speed (MHz)[2] | Number of Processors (Std/Max) | L2 ECC Cache (KB) | Memory (Std/Max) (R = RDIMM) | Form Factor | Power Supply Quantity (Std/Max) | Hot-Swap (Power, Slots, HDD, Fans) | Redundancy (Optional, Standard) | Adv System Management Processor | Onboard Ethernet (Mbps) | SCSI Controller (Dual, Ultra, RAID) | Removable Media Bays (Total/Avail) | Internal Hard Disk Drive (Std/Max) | CD-ROM (IDE)[6] | Bays (Total/Avail) | Slots (Total/Avail) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **xSeries 340 / Netfinity 4500R At-A-Glance** | | | | | | | | | | | | | | | | |
| 8656-5RY[1] | 933 | 1/2 | 256 | 128B(R)/4GB | Rack (3U) | 1/2 | P, H, F | O - Power[3] S - Fans | Y | 10/100 | D,U160 | 4/2[4] | 0/ 440.4GB[5] | 24X-10X | 8/6[5] | 5/5 |
| 8656-6RY[1, 7] | 1GHz | 1/2 | 256 | 128MB(R)/4GB | Rack (3U) | 1/2 | P, H, F | O - Power[3] S - Fans | Y | 10/100 | D,U160 | 4/2[4] | 0/ 440.4GB[5] | 24X-10X | 8/6[5] | 5/5 |

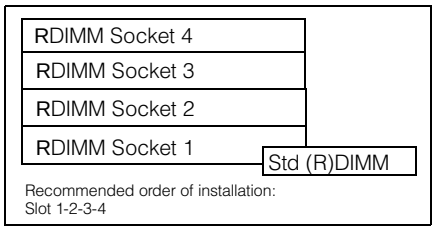
1. Housed in a 19in rack-mountable drawer and ships standard without a keyboard or mouse. See Rack Cabinets and Options section for supported IBM racks.
2. Intel Pentium III processor with advanced transfer L2 cache and 133MHz FSB.
3. Power supply redundancy requires installation of optional 270W Hot-Swap Redundant Power Supply (P/N 37L6880).
4. xSeries 340 / Netfinity 4500R includes two available removable media bays that can be converted to three slim-line (SL) hot-swap bays with the addition of optional 3-Pack Hot-Swap Expansion Kit (P/N 33L5050), doubling internal hard disk drive storage capacity.
5. Assumes installation of optional IBM 3-Pack Ultra160 Hot-Swap Expansion Kit (P/N 33L5050) which converts the two available removable media bays into three slim-line (SL) hot-swap bays.
6. Variable read rate. Actual playback speed will vary and is often less than the maximum possible.
7. This model is an IBM xSeries 340.

**xSeries 340 / Netfinity 4500R Processors**

| Part Number | Processor Upgrades | SMP Support[1] | Processor Speed Upgrade[2] |
|---|---|---|---|
| 19K4631 | Netfinity 933MHz 133MHz FSB/256KB Upgrade with Pentium III Processor | 5RY | - |
| 19K4640 | 1GHz Upgrade with 133MHz FSB and 256KB Advanced Transfer Cache Pentium III Processor | 6RY | 5RY |

1. One additional processor may be installed, providing a maximum of two. All processors must be identical in type, speed, and cache size.
2. Requires removal of the standard processor. A maximum of two processors may be installed. All processors must be identical in type, speed and cache size. Upgrades may require a BIOS update. To obtain the latest Flash BIOS, access www.pc.ibm.com/support and enter machine "Type-Model" in Quick Path. Select "Downloadable files" then "BIOS."

## xSeries 340 / Netfinity 4500R Memory




| Part Number | Memory Description[1] |
|---|---|
| 33L3123 | 128MB, 133MHz SDRAM ECC RDIMM II |
| 33L3125 | 256MB, 133MHz SDRAM ECC RDIMM II |
| 33L3127 | 512MB, 133MHz SDRAM ECC RDIMM II |
| 33L3129 | 1GB, 133MHz SDRAM ECC RDIMM II |

1. The recommended order of installation is in sequence from Socket 1 to Socket 4. Memory size is not a factor.

| Total Memory[1] | Quantity of RDIMMs Added | | | |
|---|---|---|---|---|
| 128MB (1 x 128) Models | 128MB (33L3123) | 256MB (33L3125) | 512MB (33L3127) | 1GB (33L3129) |
| 256MB | 1 | - | - | - |
| 384MB | 2 or | 1 | - | - |
| 512MB | 3 | - | - | - |
| 640MB | - | 2 or | 1 | - |
| 896MB | - | 3 | - | - |
| 1024MB | - | 4[2] | - | - |
| 1152MB | - | - | 2 or | 1 |
| 1664MB | - | - | 3 | - |
| 2048MB | - | - | 4[2] | - |
| 2176MB | - | - | - | 2 |
| 3200MB | - | - | - | 3 |
| 4096MB (max) | - | - | - | 4[2] |

This table does not represent all possible memory configurations. Memory modules may vary in price per MB. Selection of smaller RDIMMs may provide a more cost-effective alternative to using larger RDIMMs.
1. Network operating systems may limit the maximum amount of addressable memory. See operating system specifications for further information.
2. Requires removal of standard memory.

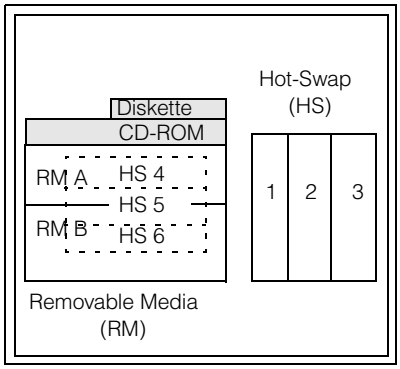
## xSeries 340 / Netfinity 4500R Hard Disk Drive (HDD) and External Storage

| Total Int Storage[1] | 7200RPM HDDs | | | 10,000RPM HDDs | | | | 15,000RPM HDDs | |
|---|---|---|---|---|---|---|---|---|---|
| | 9.1GB (37L7201) | 18.2GB (37L7202) | 36.4GB (37L7203) | 9.1GB (37L7204) | 18.2GB (37L7205) | 36.4GB (37L7206) | 73.4GB (06P5756) | 9.1GB (19K0655) | 18.2GB (19K0656) |
| 0GB | Standard on base models | | | | | | | | |
| 9.1GB | 1 | - | - | 1 | - | - | - | 1 | - |
| 18.2GB | 2 | 1 | - | 2 | 1 | - | - | 2 | 1 |
| 27.3GB | 3 | - | - | 3 | - | - | - | 3 | - |
| 36.4GB | 4[2] | 2 | 1 | 4[2] | 2 | 1 | - | 4[2] | 2 |
| 45.5GB | 5[2] | - | - | 5[2] | - | - | - | 5[2] | - |
| 54.6GB | 6[2] | 3 | - | 6[2] | 3 | - | - | 6[2] | 3 |
| 72.8GB | - | 4[2] | 2 | - | 4[2] | 2 | - | - | 4[2] |
| 91GB | - | 5[2] | - | - | 5[2] | - | - | - | 5[2] |
| 109.2GB | - | 6[2] | 3 | - | 6[2] | 3 | - | - | 6[2] |
| 145.6GB | - | - | 4[2] | - | - | 4[2] | - | - | - |
| 182GB | - | - | 5[2] | - | - | 5[2] | - | - | - |
| 218.4GB | - | - | 6[2] | - | - | 6[2] | - | - | - |
| 220.2GB | - | - | - | - | - | - | 3 | - | - |
| 293.6GB | - | - | - | - | - | - | 4[2] | - | - |
| 367GB | - | - | - | - | - | - | 5[2] | - | - |
| 440.4GB (max) | - | - | - | - | - | - | 6[2] | - | - |

This table does not represent all possible HDD configurations.
1. Select a total storage row then select the quantity of HDDs from a column corresponding to the HDD of choice. Total Internal Storage listed is within +/- 0.2GB unless otherwise noted.
2. Requires IBM 3-Pack Ultra160 Hot-Swap Expansion Kit (P/N 33L5050).

| Bay | Form Factor | Height | Front Access | Usage |
|---|---|---|---|---|
| - | 89mm (3.5in) | - | Yes | Diskette |
| - | 133mm (5.25in) | - | Yes | IDE CD-ROM |
| 1 … 3 | HS | SL[1] | Yes | Open |
| A, B | 133mm (5.25in) | HH[2] | Yes | Open |
| 4 … 6[3] | HS | SL[1] | Yes | Open |

1. Half-High devices are NOT supported.
2 Two half-high (HH) bays can be combined to support a single full-high (FH) device. By installing Netfinity 3-Pack Ultra160 Hot-Swap Expansion Kit (P/N 33L5050), bays A and B are transformed into three SL hot-swap bays 4 … 6.
3. To enable bays 4 … 6, optional Netfinity 3-Pack Ultra160 Hot-Swap Expansion Kit (P/N 33L5050) is required.




| Part Number | Description | RPM | Height | Bays Supported[1] | Max Qty[1] |
|---|---|---|---|---|---|
| | **Ultra160 HDDs** | | | | |
| 37L7201 | 9.1GB Ultra160 SCSI Hot-Swap SL HDD | 7200 | SL | 1 … 6 | 6 |
| 37L7202 | 18.2GB Ultra160 SCSI Hot-Swap SL HDD | 7200 | SL | 1 … 6 | 6 |
| 37L7203 | 36.4GB Ultra160 SCSI Hot-Swap SL HDD | 7200 | SL | 1 … 6 | 6 |
| 37L7204 | 9.1GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD | 10000 | SL | 1 … 6 | 6 |
| 37L7205 | 18.2GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD | 10000 | SL | 1 … 6 | 6 |
| 37L7206 | 36.4GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD | 10000 | SL | 1 … 6 | 6 |
| 19K0655 | 9.1GB 15Krpm Ultra160 SCSI Hot-Swap HDD | 15000 | SL | 1 … 6 | 6 |
| 19K0656 | 18.2GB 15Krpm Ultra160 SCSI Hot-Swap HDD | 15000 | SL | 1 … 6 | 6 |
| 06P5756 | 73.4GB 10Krpm Ultra160 SCSI Hot-Swap SL HDD | 10000 | SL | 1 … 6 | 6 |
| | **Associated Options** | | | | |
| 33L5050 | IBM 3-Pack Ultra160 Hot-Swap Expansion Kit[2] | - | 3 x SL | 4 … 6 | - |

| | **External Storage Expansion Units[3]** | **Form Factor** |
|---|---|---|
| 35311RU | EXP300 Storage Expansion Unit[4] | Rack (3U) |
| 35601RU | FAStT EXP500 Storage Expansion Unit[5] | Rack (3U) |
| 35421RU | FAStT200 Storage Server[6, 7] | Rack (3U) |
| 35422RU | FAStT200 HA Storage Server[6] | Rack (3U) |
| 19K1121 | FAStT200 Redundant RAID Controller | - |

1. xSeries 340 / Netfinity 4500R ships with Bays 1 … 3 enabled. To enable installation of greater than three HDDs requires IBM 3-Pack Ultra160 Hot-Swap Expansion Kit (P/N 33L5050).
2. IBM 3-Pack Ultra160 Hot-Swap Expansion Kit (P/N 33L5050) includes a hot-swap backplane and associated components for two cabling options. The backplane may be cabled directly to the second integrated SCSI channel or be supported by the same SCSI channel as the standard backplane through the use of an included repeater card.
3. To configure a SCSI storage device, select an optional SCSI controller then refer to Appendix D: Cables - Storage Units - Controllers to confirm the controller supports the desired External Storage Expansion Unit and to select a supported cable. For HDD or other expansion unit options, see the specific expansion unit section. For Fibre Channel storage devices, refer to the Fibre Array Solutions section.
4. EXP300 includes a single 2M Ultra2 SCSI cable and dual hot-swap 500W redundant power supplies, each with its own power cord.
5. FAStT EXP500 Storage Expansion Unit (P/N 35601RU) includes dual hot-swap 350W power supplies, each with its own power cord.
6. The FAStT200 includes two hot-swap, 350W auto-ranging redundant power supplies, each with its own power cord.
7. Can be upgraded to FAStT200 HA Storage Server through the addition of a FAStT200 Redundant RAID Controller (P/N 19K1121).

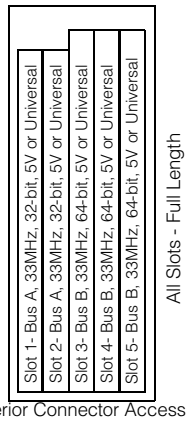
## xSeries 340 / Netfinity 4500R Internal SCSI Cabling

The xSeries 340 and Netfinity 4500R contain a DASD backplane supporting three hot-swap, SCA-2 compliant drive bays. The backplane is connected to one of the internal connectors of the integrated Ultra160 SCSI controller through a 16-bit LVD SCSI cable. A single-drop 16-bit SCSI cable is included with the server for attachment from the second internal Ultra160 connector to a removable media bay device. If an LVD attachment is required or more than one media bay device is required, a terminated two-drop 16-bit LVD SCSI cable available in the Netfinity Media Bay Conversion Kit (P/N 10K2340) must be ordered. No external SCSI port is included.

If optional Netfinity 3-Pack Ultra160 Hot-Swap Expansion Kit (P/N 33L5050) is installed in the removable media bays, four cabling options are possible. Included with this option is a 16-bit LVD SCSI cable, identical to the one used for attachment of the standard hot-swap backplane, which can be used to attach the optional 3-Pack Ultra160 Hot-Swap backplane directly to the second onboard SCSI connector or that of an optional RAID adapter. Alternatively, a repeater card and cable are included which may be used to link the standard hot-swap backplane and optional hot-swap backplane together while utilizing the standard SCSI cable for attachment of the repeater card to one of the onboard SCSI connectors or that of an optional RAID adapter.

## xSeries 340 / Netfinity 4500R I/O Options

| Part Number | Description | Adapter Length | PCI Support[24] | Slots Supported[24] |
|---|---|---|---|---|
| | **Storage Controllers[1]** | | | |
| 37L6091 | ServeRAID-4L Ultra160 SCSI Controller[2] | Full | 64-bit | 1 … 5 |
| 37L6080 | ServeRAID-4M Ultra160 SCSI Controller[3] | Full | 64-bit | 1 … 5 |
| 37L6889 | ServeRAID-4H Ultra160 SCSI Controller[4] | Full | 64-bit | 1 … 5 |
| 06P5736 | ServeRAID-4Mx Ultra160 SCSI Controller[5] | Full | 64-bit | 1 … 5 |
| 06P5740 | ServeRAID-4Lx Ultra160 SCSI Controller[6] | Half | 64-bit | 1 … 5 |
| 19K4646 | PCI Wide Ultra160 SCSI Adapter[7] | Half | 64-bit | 1 … 5 |
| 02K3454 | PCI Fast/Wide Ultra SCSI Adapter[8] | Half | 32-bit | 1 … 5 |
| | **Fibre Storage Controllers and Options[9]** | | | |
| 00N6881 | Netfinity FAStT Host Adapter | Half | 64-bit | 1 … 5 |
| 35521RU | FAStT500 Storage Server | - | - | - |
| 35421RU | FAStT200 Storage Server | - | - | - |
| 35422RU | FAStT200 HA Storage Server | - | - | - |
| 35341RU | SAN Fibre Channel Managed Hub | - | - | - |
| 2109S08 | SAN Fibre Channel Switch, 8-Port | - | - | - |
| 2109S16 | SAN Fibre Channel Switch, 16-Port | - | - | - |
| 2108R3L | SAN Data Gateway Router Ultra SCSI LVD Port[10] | - | - | - |
| | **Networking[11]** | | | |
| | **Ethernet[12]** | | | |
| 19K4401 | Netfinity Gigabit Ethernet Adapter (copper) | Half | 64-bit | 1 … 5 |
| 06P3601 | 10/100 Ethernet Server Adapter[13] | Half | 32-bit | 1 … 5 |
| 06P3701 | Gigabit Ethernet SX Server Adapter (fiber) | Half | 64-bit | 1 … 5 |
| 09N9901 | 10/100 EtherLink Server Adapter by 3Com[13] | Half | 32-bit | 1 … 5 |
| | **Token Ring** | | | |
| 34L0701 | Token-Ring 16/4 PCIAdapter 2 with Wake on LAN[13] | Half | 32-bit | 1 … 5 |
| 34L5001 | 16/4 Token-Ring PCI Management Adapter[13] | Half | 32-bit | 1 … 5 |
| 34L5201 | High-Speed 100/16/4 Token-Ring PCI Management Adapter[13] | Half | 32-bit | 1 … 5 |
| | **Communications[14]** | | | |
| 33L4618 | V.90 PCI Data/Fax Modem[15] | Half | 32-bit | 1 … 5 |
| 37L14xx | Serial I/O SST 8, 16 and 128 Port Adapters[16] | Half | 32-bit | 1 … 5 |
| | **Systems Management[17]** | | | |
| 01K7209 | Netfinity Advanced System Management PCI Adapter[18] | Full | 32-bit | 1 … 5[19] |
| 03K9309 | Netfinity Advanced System Management Interconnect Cable Kit[20] | - | - | - |
| 36L9654 | Netfinity Advanced System Management Token-Ring Connection[21] | - | - | - |
| | **Host Attach** | | | |
| 9086001 | Netfinity ESCON™ Adapter[22] | Full | 32-bit | 1 … 5[23] |


Slot 1- Bus A, 33MHz, 32-bit, 5V or Universal
Slot 2- Bus A, 33MHz, 32-bit, 5V or Universal
Slot 3- Bus B, 33MHz, 64-bit, 5V or Universal
Slot 4- Bus B, 33MHz, 64-bit, 5V or Universal
Slot 5- Bus B, 33MHz, 64-bit, 5V or Universal
All Slots - Full Length
Exterior Connector Access

1. xSeries 340 / Netfinity 4500R includes a dual-port, dual-channel Ultra160 SCSI controller for internal use only. No standard external port is available. See "Internal SCSI Cabling" for cabling alternatives. Due to xSeries / Netfinity 4500R's low profile, some adapters with connectors on the top edge may not have sufficient clearance to attach a cable. Cabling interferences are identified in the footnotes.
2. ServeRAID-4L Ultra160 SCSI Controller is powered by a 100MHz Intel i960 processor and provides a single channel, 16MB of ECC cache and either one internal or one external Ultra160 connection. External connector is 0.8mm VHDCI.
3. ServeRAID-4M Ultra160 SCSI Controller is powered by a 100MHz Intel i960 processor and provides two channels, 64MB of battery-backed ECC cache and two external 0.8mm VHDCI Ultra160 connectors.
4. ServeRAID-4H Ultra160 SCSI Controller is powered by a 266MHz PowerPC 750 processor and provides 128MB of battery-backed ECC cache. The internal connectors are not accessible due to cabling interference. Four external Ultra160 0.8mm VHDCI connectors are available.
5. ServeRAID-4Mx Ultra160 SCSI Controller is powered by a 100MHz Intel Zion GC80303 processor that provides 64MB of battery-backed ECC cache and two internal and two external Ultra160 connections (only two connectors may be used). External connections are 0.8mm VHDCI.
6. ServeRAID-4Lx Ultra160 SCSI Controller is powered by a 100MHz Intel Zion GC80303 processor and provides a single channel, 32MB of ECC cache and either one internal or one external Ultra160 connection. External connector is 0.8mm VHDCI.
7. PCI Wide Ultra160 SCSI Adapter (P/N 19K4646) provides a single channel with one internal connector, a five-drop multi-mode terminated LVD SCSI cable and one external 0.8mm VHDCI connector. Only one of the two connectors may be utilized.
8. PCI Fast/Wide Ultra SCSI Adapter provides one external 68-pin high density connector. The internal connectors are not accessible due to a cabling interference.
9. See Fibre Array Solutions section for additional configuration information.
10. The 2108R3L SAN Data Gateway Router Ultra SCSI LVD port provides one integrated short-wave optical port and two SCSI ports for tape storage connections (LVD, HVD and single-ended).
11. xSeries 340 / Netfinity 4500R includes a full-duplex, 10/100Mbps Ethernet PCI controller.
12. In a fault-tolerant networking environment, using the fault-tolerant software delivered with the Ethernet adapters of a single manufacturer is recommended. Installing fault-tolerant solutions provided by multiple manufacturers may cause failures if the intermediate drivers provided with the adapters are not compatible. The onboard Ethernet is Intel-based, which is compatible with the two Intel-based optional Ethernet adapters (P/N 06P3601, 06P3701).
13. The Wake on LAN function of this option is not supported by this server.
14. xSeries 340 / Netfinity 4500R includes two USB ports, two serial and one parallel port.
15. Due to homologation variances, modem availability may differ by country.
16. See Appendix E for details on Serial I/O Options and configuration limitations.
17. The Netfinity Advanced Systems Management Processor and Interconnect Bus integrated into xSeries 340 / Netfinity 4500R works with Netfinity Director to provide significant system management function. When used with optional Netfinity Advanced System Management PCI Adapter (P/n 01K7209) and Netfinity Advanced System Management Interconnect Cable Kit (P/N 03K9309) additional management and control of up to 12 service processors from a remote console through a single modem or LAN connection is possible.
18. Includes PCI adapter, Netfinity Advanced System Management Interconnect Cable Kit components and 56-watt AC adapter, which requires a separate power source. Provides an integrated 10/100 Ethernet port and a PCMCIA slot to support optional Netfinity Advanced System Management Token-Ring Connection (P/N 36L9654).
19. A maximum quantity of one is supported.
20. Required for all xSeries and Netfinity Servers containing a standard Advanced System Management Processor that are to be interconnected for system management support through a LAN or modem connection. Optional Netfinity Advanced System Management PCI Adapter (P/N 01K7209) includes the contents of this option. Up to 12 service processors may be interconnected (including standard and optional processors) with an aggregate connection length of no more than 91.4m (300ft). A customer-supplied Ethernet cable is required for each interconnection.
21. Contains an IBM Turbo 16/4 Token-Ring PCI card, which installs in the PCMCIA card slot of Netfinity Advanced System Management PCI Adapter (P/N 01K7209), and a PC Card to nine-pin D-Shell cable which is routed to an available adapter slot opening (reduces available slots by one). The Netfinity Advanced System Management PCI Adapter's integrated Ethernet port and Netfinity Advanced System Management Token-Ring Connection cannot be connected or used together.
22. Provides an ESCON MIC and a DB9 Serial Port. Cables are not included but are available through S/390 channels. Contact your IBM representative for additional information.
23. A maximum of two 9086001 adapters (installed in nonadjacent slots) are supported in a single server.
24. A 64-bit adapter installed into a 32-bit slot will transfer data at 32-bit rates. Adapters rated at 66MHz will operate at 33MHz when installed in a 33MHz slot.

## xSeries 340 / Netfinity 4500R Power, Monitors & Accessories

| Part Number | Description |
|---|---|
| | **Power[1]** |
| 37L6880 | 270W Hot-Swap Redundant Power Supply |
| | **Uninterruptible Power Supply (UPS)[2]** |
| 94G6674 | APC Smart-UPS 1400RMB[3] |
| 94G6676 | APC Smart-UPS 3000RMB[3] |
| 37L6861 | APC Smart-UPS 5000RMB[4] |
| | **Monitors[5]** |
| 633347N | E51 Color Monitor 15in (350mm, 13.8in Viewable Image Size), stealth black[6] |
| 6331N2N | E54 Color Monitor 15in (350mm, 13.8in Viewable Image Size), stealth black[6] |
| 6332J1N | E74 Color Monitor 17in (403mm, 15.9in Viewable Image Size), stealth black[6] |
| 66274AN | G78 Color Monitor 17in (406.4mm, 16in Viewable Image Size), stealth black[6] |
| 9511AG4 | T540 Flat Panel Color Monitor 15in (381mm, 15in viewable image), stealth black[7] |

1. xSeries 340 / Netfinity 4500R systems include a single 270W, hot-swap power supply and two 9ft power cords, one high voltage IEC 320-C13 to IEC 320-C14 and one low voltage IEC 320-C13 to NEMA 5-15P. Power supply redundancy can be achieved with the addition of optional 270W Hot-Swap Redundant Power Supply (P/N 37L6880).
2. For runtimes and UPS attributes see Appendix C: UPS Runtime Estimate.
3. Height is 3U. See Rack Cabinets and Options section for supported IBM racks.
4. Height is 5U. See Rack Cabinets and Options section for supported IBM racks.
5. xSeries 340 / Netfinity 4500R uses an SVGA controller (S3 Savage4 chipset) with 8MB of video memory.
6. Installation within a rack requires optional Monitor Compartment (P/N 94G7444).
7. Installation within a rack requires optional Netfinity Flat Panel Monitor Rack Mount Kit II (P/N 37L6888) and Netfinity Rack Keyboard Tray (P/N 28L4707). A space saver keyboard may coexist within the same 28L4707 keyboard tray.

| Part Number | Description |
|---|---|
| **Rack and NetBAY[1]** | |
| | Refer to the Rack Cabinets and Options section for information concerning IBM racks and rack-supported devices. |
| **Keyboard and Mouse[2]** | |
| 28L3644 | Space Saver II Keyboard[3, 5] |
| 01K1260 | TrackPoint IV 104-Key Black Keyboard[4, 5] |
| 28L3621 | Preferred Keyboard (stealth black)[4] |
| 28L3673 | Sleek 2-Button Stealth Black Mouse |

1. xSeries 340 / Netfinity 4500R is housed in a 19in rack-mountable drawer and requires one of the racks listed in the Rack Cabinets and Options section.
2. xSeries 340 / Netfinity 4500R supports rack configurations only and ships without a mouse or keyboard.
3. Installation within a rack requires optional keyboard tray (P/N 28L4707), which stows in ready-to-use position.
4. Installation within a rack requires optional keyboard tray (P/N 28L4707). This keyboard cannot share a keyboard tray with a flat panel display.
5. Advanced TrackPoint IV features are not available on IBM xSeries or Netfinity systems.

## xSeries 340 / Netfinity 4500R Tape Options

| Part Number | Tape Drives | Bays Supported | SCSI Interface (bit) | Form Factor | Termination Included | 68/50-pin Converter Incl | Ext Tape Enclosures |
|---|---|---|---|---|---|---|---|
| 00N7991 | 20/40GB DDS/4 4mm Internal Tape Drive[2] | A, B | 16 Ultra2 LVD | 89mm (3.5in) HH or 133mm (5.25in) HH | N[4] | - | 3551001[1] |
| 09N4040 | 20/40GB DLT Internal SCSI Tape Drive | A+B | 8 | 133mm (5.25in) FH | N[4] | Y | 3551001 |
| 00N7990 | 40/80GB DLT Internal SCSI Tape Drive[2] | A+B | 16 Ultra2 LVD | 133mm (5.25in) FH | N[4] | - | 3551001[1] |
| 00N8017 | 60/120GB 8mm M2 SCSI Tape Drive[2] | A, B | 16 Ultra2 LVD | 133mm (5.25in) HH | N[4] | - | 3551001[1] |
| 00N8016 | 100/200GB LTO Tape Drive[2] | A+B | 16 Ultra2 LVD | 133mm (5.25in) FH | N[4] | - | 3551001[1] |
| 24P2396 | 100/200GB LTO Half-High Tape Drive[2] | A, B | 16 Ultra2 LVD | 133mm (5.25in) HH | N[4] | - | 3551001[1] |
| 24P2398 | 40/80GB Half-High DLTVS Internal SCSI Tape Drive[2] | A, B | 16 Ultra2 LVD | 133mm (5.25in) HH | N[4] | - | 3551001[1] |
| **Tape Autoloaders** | | | | | | | |
| 00N7992 | 120/240GB DDS/4 Tape Autoloader[2] | A+B | 16 Ultra2 LVD | 133mm (5.25in) FH | N[4] | - | 3551001[1] |
| 3600109 | 3600 Series 900GB/1.8TB LTO Tape Autoloader[3] | - | 16 Ultra2 LVD | Tower or 6U Rack | Y | - | - |
| **External Tape Libraries[5]** | | | | | | | |
| 3502R14 | DLT Tape Library | - | 16 | Rack | Y | - | - |
| 3570C2X | Magstar MP 3570 Tape Subsystem | - | HVD | 6U Rack | Y | - | - |
| 3600220 | 3600 Series 2/4TB LTO Tape Library (Tower) | - | 16 Ultra2 LVD | Tower | Y | - | - |
| 3600R20 | 3600 Series 2/4TB LTO Tape Library (Rack) | - | 16 Ultra2 LVD | 5U Rack | Y | - | - |
| 09N4048 | 3600 Series LTO Drive Upgrade Option[6] | - | 16 Ultra2 LVD | - | N | - | - |
| **External Tape Enclosures** | | | | | | | |
| 3551001 | NetMEDIA Storage Expansion Unit EL[7] | - | 16 | Rack | Y | N | - |
| 10L7113 | NetMEDIA Systems Management Adapter[8] | - | 16 LVD | - | N | N | 3551001 |
| **Associated Options** | | | | | | | |
| 10K2340 | Media Bay Tray and LVD Cable Kit[1, 2] | - | 16 LVD | Int | Y | N | 3551001 |

Note: xSeries 340 / 4500R includes a single drop, 16-bit, single-ended, nonterminated SCSI cable for attachment of a device in Bay A or B to the second integrated Ultra160 SCSI channel or supported adapter. No external SCSI port is available. All tape drives and enclosures are supported by PCI Wide Ultra160 SCSI Adapter (P/N 19K4646) which has an external 0.8mm VHDCI connector.
1. LVD support for LVD devices installed in a NetMEDIA Storage Expansion Unit EL (P/N 3551001) requires replacement of the standard single-ended internal cables with one or more (depending on configuration) cables from Media Bay Tray and LVD Cable Kit (P/N 10K2340) which contains a single two-drop multi-mode terminated cable. If the standard cables are used for attachment to LVD devices, single-ended SCSI rules and bus speeds apply.
2. LVD support for LVD devices requires installation of the 16-bit multi-mode terminated, two-drop, LVD SCSI cable included with optional Media Bay Tray and LVD Cable Kit (P/N 10K2340).
3. If installed in a rack, a fixed shelf is required. Allow an additional 1U for the fixed shelf. One unit only per shelf is supported.
4. Termination requires installation of the multi-mode terminated, two-drop, LVD SCSI cable included with optional Media Bay Tray and LVD Cable Kit (P/N 10K2340).
5. Tape library attributes and prerequisites are located in Appendix B: Tape Library Attributes.
6. Install in second drive bay of 3600 Series LTO Tape Libraries or in either of the two bays of 3600 Series 2-Drive 20-Cartridge Expander Module to increase performance. Includes an LTO (Ultrium) drive and a one-meter external LVD SCSI cable.
7. NetMEDIA Storage Expansion Unit EL (P/N 3551001) is a black 3U, 19in rack mountable tape enclosure which includes two full- high (FH) or four- half high (HH) extended length 133mm (5.25in) bays, two external 68-pin high density connectors and two internal four-drop single-ended terminated 16-bit SCSI cables for device attachment. Two power supplies and two power cords are also included. Tip: The front rail clips will need to be reversed and screwed in from behind to secure the unit in a 930842x rack.
8. NetMEDIA Systems Management Adapter (P/N 10L7113) may be installed in a 3551001 to provide repeater function, LVDS interface, aggregate cable lengths up to 12m when attached to an LVD SCSI controller, and auto-termination when the 3551001 is powered off. External connector is 0.8mm VHDCI.

Note: Additional tape attributes can be found in Appendix A: Tape Drive Attributes.

## xSeries 340 / Netfinity 4500R Sample Configurations

Note: The following sample configurations are for illustration only and may not be suitable for any specific customer installation. Contact your IBM Business Partner or IBM Marketing Representative for assistance with your specific configuration requirements.

### Internet Server

| Part Number | Description | Quantity |
|---|---|---|
| 8656-5RY | Netfinity 4500R Pentium III 933MHz/256KB L2, 128MB ECC, OPEN, 24X, PCI (Rack 3U) | 1 |
| 33L3123 | 128MB SDRAM ECC RDIMM II | 1[1] |
| 37L6080 | ServeRAID-4M Ultra160 SCSI Controller | 1 |
| 37L7204 | 9.1GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD | 3[2] |
| 00N8017 | 60/120GB 8mm M2 SCSI Tape Drive | 1 |
| 10K2340 | Media Bay Tray and LVD Cable Kit | 1 |
| 6331N2N | E54 Color Monitor 15in (350mm, 13.8in Viewable Image Size), stealth black | 1 |
| 94G6674 | APC Smart-UPS 1400RMB | 1 |
| 37L6880 | 270W Hot-Swap Redundant Power Supply | 1 |
| **Industry Standard 19in Rack, EIA-310D, min depth of 28in (711mm)** | | |
| 9306200 | Netfinity NetBAY22 | 1 |
| 28L3644 | Space Saver II Keyboard | 1 |
| 94G6670 | Blank Filler Panel Kit | 2 |

1. For a total of 256MB of system memory.
2. Three HDDs are used for RAID 5 protection. Effective capacity is two HDDs or 18.2GB.

An Internet server handles all requests from the Internet (Intranet or Extranet). Usually this type of server has the same characteristics as a file server. The main difference is that an Internet server talks a different language (TCP/IP vs NETBEUI or IPX/SPX) and often needs to do an extra security check (firewall). In the case of an Internet server, the server itself talks mostly to one client, the Internet Service Provider (ISP), instead of many clients as a file server does.

With this in mind the Netfinity 4500R was selected to provide an affordable price point for the growing Internet server market, with two-way Pentium III processing, 256MB of system memory (expandable to 4GB), and availability features such as RAID-protected internal hot-swap storage and power protection with an APC Smart-UPS.

The network configuration depends on the method that will be used to connect the server to the Internet. Usually fast Ethernet routers are used, but if other methods are used, you can add the appropriate adapter. The configuration includes a tape backup unit for secure backup of critical data in the event of a system or storage failure.

### Application Server

| Part Number | Description | Quantity |
|---|---|---|
| 8656-6RY | xSeries 340 Pentium III 1GHz/256KB L2, 128MB ECC, OPEN, 24X, PCI (Rack 3U) | 1 |
| 19K4630 | xSeries1GHz Upgrade with 133 FSB and 256KB Advanced Transfer Cache Pentium III Processor | 1 |
| 33L3125 | 256MB 133MHz SDRAM ECC RDIMM II | 1[1] |
| 37L6080 | ServeRAID-4M Ultra160 SCSI Controller | 1 |
| 37L7205 | 18.2GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD | 3[2] |
| 00N8017 | 60/120GB 8mm M2 SCSI Tape Drive | 1 |
| 10K2340 | Media Bay Tray and LVD Cable Kit | 1 |
| 6331N2N | E54 Color Monitor 15in (350mm, 13.8in Viewable Image Size), stealth black | 1 |
| 37L6880 | Netfinity 270W Hot-Swap Redundant Power Supply | 1 |
| 94G6674 | APC Smart-UPS 1400RMB | 1 |
| **Industry Standard 19in Rack, EIA-310D, min depth of 28in (711mm)** | | |
| 9306200 | Netfinity NetBAY22 | 1 |
| 28L3644 | Space Saver II Keyboard | 1 |
| 94G6670 | Blank Filler Panel Kit | 2 |

1. For a total of 384MB of system memory.
2. Three HDDs are used for RAID 5 protection. Effective capacity is two HDDs or 36.4GB.

An application server is designed to handle a high workload while providing application serving requirements for users. With this in mind, the xSeries 340 was selected to provide an affordable price point for an application server with two-way Pentium III processing, 384MB of system memory (expandable to 4GB), and availability features such as battery-backed cache, RAID-protected internal hot-swap storage and power protection with an APC Smart-UPS.

### xSeries 340 High Availability Cluster (P/N 25P1823 and 25P1824)[1]

(Refer to High Availability and Scalable Cluster Solutions section)

1. P/N 25P1823 includes Windows NT EE as the operating system for this integrated rack solution. P/N 25P1824 uses Windows 2000 Advanced Server.

# IBM xSeries 342

| Part Number | Processor Speed (GHz)[2] | Number of Processors (Std/Max) | L2 ECC Cache (KB) | Memory (Std/Max) (DIMM) | Form Factor | Power Supply Quantity (Std/Max) | Hot-Swap (Power, Slots, HDD, Fans) | Redundancy (Optional, Standard) | System Management Processor | Onboard Ethernet (Mbps) | SCSI Controller (Dual, Ultra, RAID) | Removable Media Bays (Total/Avail) | Internal Hard Disk Drive (Std/Max) | CD-ROM (IDE)[6] | Bays (Total/Avail) | Slots (Total/Avail) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **xSeries 342 At-A-Glance** | | | | | | | | | | | | | | | | |
| 8669-1RX[1] | 1 | 1/2 | 256 | 256MB/4GB | Rack (3U) | 1/2 | P, H, F | O - Power[3] S - Fans | Y | 10/100 | D,U160 | 4/2[4] | 0/ 440.4GB[5] | 24X-10X | 8/6[5] | 5/5 |
| 8669-2RX[1] | 1.13 | 1/2 | 512 | 256MB/4GB | Rack (3U) | 1/2 | P, H, F | O - Power[3] S - Fans | Y | 10/100 | D,U160 | 4/2[4] | 0/ 440.4GB[5] | 24X-10X | 8/6[5] | 5/5 |

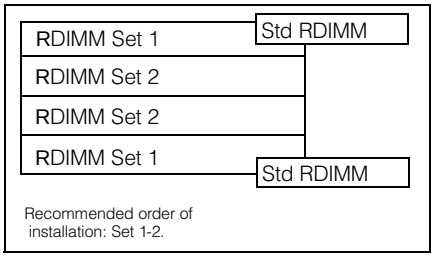
1. Housed in a 19in rack-mountable drawer and ships standard without a keyboard or mouse. See Rack Cabinets and Options section for supported IBM racks.
2. Intel Pentium III processor with advanced transfer L2 cache and 133MHz FSB.
3. Power supply redundancy requires installation of optional 270W Hot-Swap Redundant Power Supply (P/N 37L6880).
4. xSeries 342 includes two available removable media bays that can be converted to three slim-line (SL) hot-swap bays with the addition of optional 3-Pack Ultra160 Hot-Swap Expansion Kit (P/N 33L5050), doubling internal hard disk drive storage capacity.
5. Assumes installation of optional Netfinity 3-Pack Ultra160 Hot-Swap Expansion Kit (P/N 33L5050) which converts the two available removable media bays into three slim-line (SL) hot-swap bays.
6. Variable read rate. Actual playback speed will vary and is often less than the maximum possible.

**xSeries 342 Processors**

| Part Number | Processor Upgrades | SMP Support[1] | Processor Speed Upgrade[2] |
|---|---|---|---|
| 24P3511 | xSeries 1GHz/133MHz 256KB Cache Upgrade with Pentium III Processor | 1RX | - |
| 24P3512 | xSeries 1.13GHz/133MHz 512KB Cache Upgrade with Pentium III Processor SVR | 2RX | 1RX |

1. One additional processor may be installed, providing a maximum of two. All processors must be identical in type, speed, and cache size.
2. Requires removal of the standard processor. A maximum of two processors may be installed. All processors must be identical in type, speed and cache size. Upgrades may require a BIOS update. To obtain the latest Flash BIOS, access www.pc.ibm.com/support and enter machine "Type-Model" in Quick Path. Select "Downloadable files" then "BIOS."

## xSeries 342 Memory




| Total Memory[1] | Quantity of RDIMMs Added | | | |
|---|---|---|---|---|
| 256MB (2 x 128) Models | 128MB (33L3320) | 256MB (33L3322) | 512MB (33L3324) | 1GB (33L3326) |
| 512MB | 2 | - | - | - |
| 768MB | - | 2 | - | - |
| 1024MB[2] | - | 4 | - | - |
| 1280MB | - | - | 2 | - |
| 1152MB[2] | - | - | 4 | - |
| 2.25GB | - | - | - | 2 |
| 4GB (max)[2] | - | - | - | 4 |

This table does not represent all possible memory configurations. Memory modules may vary in price per MB. Selection of smaller RDIMMs may provide a more cost-effective alternative to using larger RDIMMs.
1. Network operating systems may limit the maximum amount of addressable memory. See operating system specifications for further information.
2. Requires removal of standard memory.

| Part Number | Memory Description[1] |
|---|---|
| 33L3320 | IBM 128MB PC133 ECC SDRAM RDIMM |
| 33L3322 | IBM 256MB PC133 ECC SDRAM RDIMM |
| 33L3324 | IBM 512MB PC133 ECC SDRAM RDIMM |
| 33L3326 | IBM 1GB PC133 ECC SDRAM RDIMM |

1. Install memory options in pairs beginning with set 1.

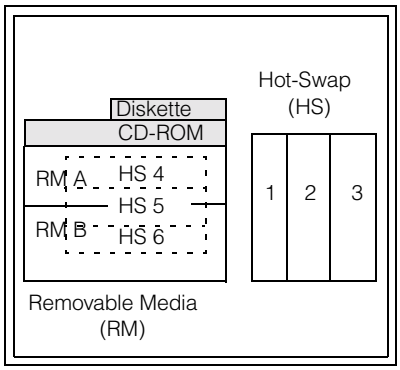
## xSeries 342 Hard Disk Drive (HDD) Storage

| Total Int Storage[1] | 7200RPM HDDs | | | 10,000RPM HDDs | | | | 15,000RPM HDDs | |
|---|---|---|---|---|---|---|---|---|---|
| | 9.1GB 37L7201 | 18.2GB 37L7202 | 36.4GB 37L7203 | 9.1GB 37L7204 | 18.2GB 37L7205 | 36.4GB 37L7206 | 73.4GB 06P5756 | 9.1GB 19K0655 | 18.2GB 19K0656 |
| 0GB | Standard on base models | | | | | | | | |
| 9.1GB | 1 | - | - | 1 | - | - | - | 1 | - |
| 18.2GB | 2 | 1 | - | 2 | 1 | - | - | 2 | 1 |
| 27.3GB | 3 | - | - | 3 | - | - | - | 3 | - |
| 36.4GB | 4[2] | 2 | 1 | 4[2] | 2 | 1 | - | 4[2] | 2 |
| 45.5GB | 5[2] | - | - | 5[2] | - | - | - | 5[2] | - |
| 54.6GB | 6[2] | 3 | - | 6[2] | 3 | - | - | 6[2] | 3 |
| 72.8GB | - | 4[2] | 2 | - | 4[2] | 2 | - | - | 4[2] |
| 91GB | - | 5[2] | - | - | 5[2] | - | - | - | 5[2] |
| 109.2GB | - | 6[2] | 3 | - | 6[2] | 3 | - | - | 6[2] |
| 145.6GB | - | - | 4[2] | - | - | 4[2] | - | - | - |
| 182GB | - | - | 5[2] | - | - | 5[2] | - | - | - |
| 218.4GB | - | - | 6[2] | - | - | 6[2] | - | - | - |
| 220.2GB | - | - | - | - | - | - | 3 | - | - |
| 293.6GB | - | - | - | - | - | - | 4[2] | - | - |
| 367GB | - | - | - | - | - | - | 5[2] | - | - |
| 440.6GB (max) | - | - | - | - | - | - | 6[2] | - | - |

This table does not represent all possible HDD configurations.
1. Select a total storage row then select the quantity of HDDs from a column corresponding to the HDD of choice. Total Internal Storage listed is within +/- 0.2GB unless otherwise noted.
2. Requires IBM 3-Pack Ultra160 Hot-Swap Expansion Kit (P/N 33L5050).

| Bay | Form Factor | Height | Front Access | Usage |
|---|---|---|---|---|
| - | 89mm (3.5in) | - | Yes | Diskette |
| - | 133mm (5.25in) | - | Yes | IDE CD-ROM |
| 1 … 3 | HS | SL[1] | Yes | Open |
| A, B | 133mm (5.25in) | HH[2] | Yes | Open |
| 4 … 6[3] | HS | SL[1] | Yes | Open |

1. Half-High devices are NOT supported.
2 Two half-high (HH) bays cannot be combined to support a single full-high (FH) device. By installing the 3-Pack Ultra160 Hot-Swap Expansion Kit (P/N 33L5050), bays A and B are transformed into three SL hot-swap bays 4 … 6.
3. To enable bays 4 … 6, optional 3-Pack Ultra160 Hot-Swap Expansion Kit (P/N 33L5050) is required.




| Part Number | Description | RPM | Height | Bays Supported[1] | Max Qty |
|---|---|---|---|---|---|
| | **Ultra160 HDDs** | | | | |
| 37L7201 | 9.1GB Ultra160 SCSI Hot-Swap SL HDD | 7200 | SL | 1 … 6 | 6[1] |
| 37L7202 | 18.2GB Ultra160 SCSI Hot-Swap SL HDD | 7200 | SL | 1 … 6 | 6[1] |
| 37L7203 | 36.4GB Ultra160 SCSI Hot-Swap SL HDD | 7200 | SL | 1 … 6 | 6[1] |
| 37L7204 | 9.1GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD | 10000 | SL | 1 … 6 | 6[1] |
| 37L7205 | 18.2GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD | 10000 | SL | 1 … 6 | 6[1] |
| 37L7206 | 36.4GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD | 10000 | SL | 1 … 6 | 6[1] |
| 19K0655 | 9.1GB 15Krpm Ultra160 SCSI Hot-Swap HDD | 15000 | SL | 1 … 6 | 6[1] |
| 19K0656 | 18.2GB 15Krpm Ultra160 SCSI Hot-Swap HDD | 15000 | SL | 1 … 6 | 6[1] |
| 06P5756 | 73.4GB 10Krpm Ultra160 SCSI Hot-Swap SL HDD | 10000 | SL | 1 … 6 | 6[1] |
| | **Associated Options** | | | | |
| 33L5050 | IBM 3-Pack Ultra160 Hot-Swap Expansion Kit[2] | - | 3 x SL | 4 … 6 | - |
| | **Optical Devices** | | | | |
| 10K3785 | 12x-8x-32x Black Internal CD-RW Drive[3] | - | | | |
| | **External Storage Expansion Units[4]** | **Form Factor** | | | |
| 35311RU | EXP300 Storage Expansion Unit[5] | Rack (3U) | | | |
| 35601RU | FAS6T EXP500 Storage Expansion Unit[6] | Rack (3U) | | | |
| 35421RU | FAStT200 Storage Server[7, 8] | Rack (3U) | | | |
| 35422RU | FAStT200 HA Storage Server[7] | Rack (3U) | | | |
| 19K1121 | FAStT200 Redundant RAID Controller | - | | | |

1. xSeries 342 ships with Bays 1 … 3 enabled. To enable installation of greater than three HDDs requires Netfinity 3-Pack Ultra160 Hot-Swap Expansion Kit (P/N 33L5050).
2. IBM 3-Pack Ultra160 Hot-Swap Expansion Kit (P/N 33L5050) includes a hot-swap backplane and associated components for two cabling options. The backplane may be cabled directly to the second integrated SCSI channel or be supported by the same SCSI channel as the standard backplane through the use of an included repeater card.
3. Install in one of the media bays, disconnecting power to the standard slim-line CD-ROM. Connect one end of the IDE cable included with the option to the IDE connector on the system board and the other end to the optical device. The middle connector on the cable may be used to connect a second optional optical device installed in the other media bay. Configure the first device as master using the preset configuration. If a second is installed, configure it as slave. The standard CD-ROM may not be used when an optional optical device is installed.
4. To configure a SCSI storage device, select an optional SCSI controller then refer to Appendix D: Cables - Storage Units - Controllers to confirm the controller supports the desired External Storage Expansion Unit and to select a supported cable. For HDD or other expansion unit options, see the specific expansion unit section. For Fibre Channel storage devices, refer to the Fibre Array Solutions section.
5. EXP300 includes a single 2M Ultra2 SCSI cable and dual hot-swap 500W redundant power supplies, each with its own power cord.
6. FAStT EXP500 Storage Expansion Unit (P/N 35601RU) includes dual hot-swap 350W power supplies, each with its own power cord.
7. The FAStT200 includes two hot-swap, 350W auto-ranging redundant power supplies, each with its own power cord.
8. Can be upgraded to FAStT200 HA Storage Server through the addition of a FAStT200 Redundant RAID Controller (P/N 19K1121).

## xSeries 342 Internal SCSI Cabling

The xSeries 342 contains seven standard drive bays. The top bay on the left contains the standard 3.5in slim-line (SL) diskette drive and the bay beneath contains the standard CD-ROM drive. Three 3.5in SL hot-swap bays in the center of the server support various hot-swap drive options. Two 5.25/3.5in half-high (HH) bays on the left support either tape back-up or an optional 3-Pack Ultra160 Hot-Swap Expansion Kit. The 24X-10X IDE CD-ROM is cabled directly to the IDE port.

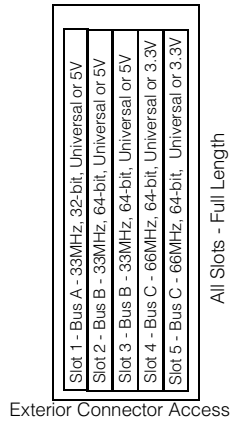
The xSeries 342 contains a DASD backplane supporting three hot-swap, SCA-2 compliant drive bays. The backplane is connected to one of the internal connectors of the integrated Ultra160 SCSI controller through a 16-bit LVD SCSI cable.

Additional Cabling Requirements:
xSeries 342 supports two storage alternatives in the two 5.25in HH media bays. An optional 3-Pack Ultra160 Hot-Swap Expansion Kit can be installed to provide additional internal HDD storage capacity. Included with this option is a 16-bit LVD SCSI cable that can be attached from the 3-Pack Ultra160 Hot-Swap backplane to

the second connector of the Ultra160 controller, or through the use of a repeater card that is included with the option, it can be cabled directly to the standard backplane. A full-high (FH) DLT tape back-up can be supported by connecting the single drop SCSI cable included with the server to the open connector of the integrated Ultra160 controller. If two SCSI devices are required, a two-drop SCSI cable available in the Media Bay Tray and LVD Cable Kit (P/N10K2340) must be ordered to connect these devices to the Ultra160 controller. In configurations where external SCSI device attachment is required, a supported SCSI adapter must be installed.

## xSeries 342 I/O Options

| Part Number | Description | Adapter Length | PCI Support[1] | Slots Supported[1, 2] |
|---|---|---|---|---|
| | **Storage Controllers[3]** | | | |
| 37L6091 | ServeRAID-4L Ultra160 SCSI Controller[4] | Full | 64-bit | 1 … 5 |
| 37L6080 | ServeRAID-4M Ultra160 SCSI Controller[5] | Full | 64-bit | 2 … 5 |
| 37L6889 | ServeRAID-4H Ultra160 SCSI Controller[6] | Full | 64-bit | 2 … 5 |
| 06P5736 | ServeRAID-4Mx Ultra160 SCSI Controller[7] | Full | 64-bit | 2 … 5 |
| 06P5740 | ServeRAID-4Lx Ultra160 SCSI Controller[8] | Half | 64-bit | 1 … 5 |
| 19K4646 | PCI Wide Ultra160 SCSI Adapter[9] | Half | 64-bit | 1 … 5 |
| 02K3454 | PCI Fast/Wide Ultra SCSI Adapter[10] | Half | 32-bit | 1 … 5 |
| | **Fibre Storage Controllers and Options[11]** | | | |
| 00N6881 | Netfinity FAStT Host Adapter | Half | 64-bit | 1 … 5 |
| 35521RU | FAStT500 Storage Server | - | - | - |
| 35421RU | FAStT200 Storage Server | - | - | - |
| 35422RU | FAStT200 HA Storage Server | - | - | - |
| 35341RU | SAN Fibre Channel Managed Hub | - | - | - |
| 2109S08 | SAN Fibre Channel Switch, 8-Port | - | - | - |
| 2109S16 | SAN Fibre Channel Switch, 16-Port | - | - | - |
| 2108R3L | SAN Data Gateway Router Ultra SCSI LVD Port[12] | - | - | - |
| | **Networking[13]** | | | |
| | **Ethernet[14]** | | | |
| 19K4401 | Netfinity Gigabit Ethernet Adapter (copper) | Half | 64-bit | 1 … 5 |
| 06P3601 | 10/100 Ethernet Server Adapter[15] | Half | 32-bit | 1 … 5 |
| 06P3701 | Gigabit Ethernet SX Server Adapter (fiber) | Half | 64-bit | 1 … 5 |
| 09N9901 | 10/100 EtherLink Server Adapter by 3Com[15] | Half | 32-bit | 1 … 5 |
| 22P4901 | IBM 10/100 Dual Port Server Adapter | Half | 64-bit | 1 … 5 |
| | **Token Ring** | | | |
| 34L5201 | High-Speed 100/16/4 Token-Ring PCI Management Adapter[15] | Half | 32-bit | 1 … 5 |
| 34L5001 | 16/4 Token-Ring PCI Management Adapter[15] | Half | 32-bit | 1 … 5 |
| | **Communications[16]** | | | |
| 33L4618 | V.90 PCI Data/Fax Modem[17] | Half | 32-bit | 1 … 5 |
| | **Systems Management** | | | |
| 09N7585 | Remote Supervisor Adapter | Half | 32-bit | 1 |
| | **Host Attach** | | | |
| 9086001 | Netfinity ESCON™ Adapter[18] | Full | 32-bit | 1 … 5[19] |


Slot 1 - Bus A - 33MHz, 32-bit, Universal or 5V
Slot 2 - Bus B - 33MHz, 64-bit, Universal or 5V
Slot 3 - Bus B - 33MHz, 64-bit, Universal or 5V
Slot 4 - Bus C - 66MHz, 64-bit, Universal or 3.3V
Slot 5 - Bus C - 66MHz, 64-bit, Universal or 3.3V
All Slots - Full Length
Exterior Connector Access

1. A 64-bit adapter installed into a 32-bit slot will transfer data at 32-bit rates. Adapters rated at 66MHz will operate at 33MHz when installed in a 33MHz slot. 33MHz adapters will reduce 66MHz buses to 33MHz.
2. To avoid damage to internal cables, do not route cabling under a full-length PCI adapter.
3. xSeries 342 includes a dual-port, dual-channel Ultra160 SCSI controller for internal use only. No standard external port is available. See "Internal SCSI Cabling" for cabling alternatives. Due to xSeries 342 low profile, some adapters with connectors on the top edge may not have sufficient clearance to attach a cable. Cabling interferences are identified in the footnotes.
4. ServeRAID-4L Ultra160 SCSI Controller is powered by a 100MHz Intel i960 processor and provides a single channel, 16MB of ECC cache and either one internal or one external Ultra160 connection. External connector is 0.8mm VHDCI.
5. ServeRAID-4M Ultra160 SCSI Controller is powered by a 100MHz Intel i960 processor and provides two channels, 64MB of battery-backed ECC cache and two external 0.8mm VHDCI Ultra160 connectors.
6. ServeRAID-4H Ultra160 SCSI Controller is powered by a 266MHz PowerPC 750 processor and provides 128MB of battery-backed ECC cache. The internal connectors are not accessible due to cabling interference. Four external Ultra160 0.8mm VHDCI connectors are available.
7. ServeRAID-4Mx Ultra160 SCSI Controller is powered by a 100MHz Intel Zion GC80303 processor that provides 64MB of battery-backed ECC cache and two internal and two external Ultra160 connections (only two connectors may be used). External connections are 0.8mm VHDCI.
8. ServeRAID-4Lx Ultra160 SCSI Controller is powered by a 100MHz Intel Zion GC80303 processor and provides a single channel, 32MB of ECC cache and either one internal or one external Ultra160 connection. External connector is 0.8mm VHDCI.
9. PCI Wide Ultra160 SCSI Adapter (P/N 19K4646) provides a single channel with one internal connector, a five-drop multi-mode terminated LVD SCSI cable and one external 0.8mm VHDCI connector. Only one of the two connectors may be utilized.
10. PCI Fast/Wide Ultra SCSI Adapter provides one external 68-pin high density connector. The internal connectors are not accessible due to a cabling interference.
11. See Fibre Array Solutions section for additional configuration information.
12. The 2108R3L SAN Data Gateway Router Ultra SCSI LVD port provides one integrated short-wave optical port and two SCSI ports for tape storage connections (LVD, HVD and single-ended).
13. xSeries 342 includes a full-duplex, 10/100Mbps Ethernet PCI controller.
14. In a fault-tolerant networking environment, using the fault-tolerant software delivered with the Ethernet adapters of a single manufacturer is recommended. Installing fault-tolerant solutions provided by multiple manufacturers may cause failures if the intermediate drivers provided with the adapters are not compatible. The onboard Ethernet is Intel-based, which is compatible with the three Intel-based optional Ethernet adapters (P/N 06P3601, 06P3701, 22P4901).
15. This server supports Wake on LAN or Alert-on-LAN functions through the integrated Ethernet controller only. These functions are not supported for optional PCI adapters.
16. xSeries 342 includes two USB ports and two serial ports.
17. Due to homologation variances, modem availability may differ by country.
18. Provides an ESCON MIC and a DB9 Serial Port. Cables are not included but are available through S/390 channels. Contact your IBM representative for additional information.
19. A maximum of two 9086001 adapters (installed in nonadjacent slots) are supported in a single server.

## xSeries 342 Power, Monitors & Accessories

| Part Number | Description |
|---|---|
| | **Power[1]** |
| 37L6880 | 270W Hot-Swap Redundant Power Supply |
| | **Uninterruptible Power Supply (UPS)[2]** |
| 94G6674 | APC Smart-UPS 1400RMB[3] |
| 94G6676 | APC Smart-UPS 3000RMB[3] |
| 37L6861 | APC Smart-UPS 5000RMB[4] |
| | **Monitors[5]** |
| 633347N | E51 Color Monitor 15in (350mm, 13.8in Viewable Image Size), stealth black[6] |
| 6331N2N | E54 Color Monitor 15in (350mm, 13.8in Viewable Image Size), stealth black[6] |
| 6332J1N | E74 Color Monitor 17in (403mm, 15.9in Viewable Image Size), stealth black[6] |
| 66274AN | G78 Color Monitor 17in (406.4mm, 16in Viewable Image Size), stealth black[6] |
| 9511AG4 | T540 Flat Panel Color Monitor 15in (381mm, 15in viewable image), stealth black[7] |

1. xSeries 342 systems include a single 270W, hot-swap power supply and two 9ft power cords, one high voltage IEC 320-C13 to IEC 320-C14 and one low voltage IEC 320-C13 to NEMA 5-15P. Power supply redundancy can be achieved with the addition of optional 270W Hot-Swap Redundant Power Supply (P/N 37L6880).
2. For runtimes and UPS attributes see Appendix C: UPS Runtime Estimate.
3. Height is 3U. See Rack Cabinets and Options section for supported IBM racks.
4. Height is 5U. See Rack Cabinets and Options section for supported IBM racks.
5. xSeries 342 uses an SVGA controller (S3 Savage4 chipset) with 8MB of video memory.
6. Installation within a rack requires optional Monitor Compartment (P/N 94G7444).
7. Installation within a rack requires optional Netfinity Flat Panel Monitor Rack Mount Kit II (P/N 37L6888) and Netfinity Rack Keyboard Tray (P/N 28L4707). A space saver keyboard may coexist within the same 28L4707 keyboard tray.

| Part Number | Description |
|---|---|
| **Rack and NetBAY[1]** | |
| | Refer to the Rack Cabinets and Options section for information concerning IBM racks and rack-supported devices. |
| **Keyboard and Mouse[2]** | |
| 28L3644 | Space Saver II Keyboard[3, 5] |
| 01K1260 | TrackPoint IV 104-Key Black Keyboard[4, 5] |
| 28L3621 | Preferred Keyboard (stealth black)[4] |
| 10K3849 | 106-key Preferred USB Keyboard with 2-port USB Hub (stealth black)[4] |
| 22P5150 | TrackPoint USB Space Saver Keyboard[3, 5] |
| 28L3673 | Sleek 2-Button Stealth Black Mouse |
| 33L3244 | Sleek USB Mouse (stealth black) |

1. xSeries 342 is housed in a 19in rack-mountable drawer and requires one of the racks listed in the Rack Cabinets and Options section.
2. xSeries 342 supports rack configurations only and ships without a mouse or keyboard.
3. Installation within a rack requires optional keyboard tray (P/N 28L4707), which stows in ready-to-use position.
4. Installation within a rack requires optional keyboard tray (P/N 28L4707). This keyboard cannot share a keyboard tray with a flat panel display.
5. Advanced TrackPoint IV features are not available on IBM xSeries or Netfinity systems.

## xSeries 342 Tape Options

| Part Number | Tape Drives | Bays Supported | SCSI Interface (bit) | Form Factor | Termination Included | 68/50-pin Converter Incl | Ext Tape Enclosures |
|---|---|---|---|---|---|---|---|
| 00N7991 | 20/40GB DDS/4 4mm Internal Tape Drive[1] | A, B | 16 Ultra2 LVD | 89mm (3.5in) HH or 133mm (5.25in) HH | N[2] | - | 3551001[4] 3510020[3] |
| 09N4040 | 20/40GB DLT Internal SCSI Tape Drive | A+B | 8 | 133mm (5.25in) FH | N[2] | Y | 3551001 |
| 00N7990 | 40/80GB DLT Internal SCSI Tape Drive[1] | A+B | 16 Ultra2 LVD | 133mm (5.25in) FH | N[2] | - | 3551001[4] |
| 00N8015 | 110/220GB Super DLT Internal SCSI Tape Drive[1] | A+B | 16 Ultra2 LVD | 133mm (5.25in) FH | N[2] | - | 3551001[4] |
| 00N8016 | 100/200GB LTO Tape Drive[1] | A+B | 16 Ultra2 LVD | 133mm (5.25in) FH | N[2] | - | 3551001[4] |
| 00N8017 | 60/120GB 8mm M2 SCSI Tape Drive[1] | A, B | 16 Ultra2 LVD | 133mm (5.25in) HH | N[2] | - | 3551001[4] 3510020[3] |
| 24P2396 | 100/200GB LTO Half-High Tape Drive[1] | A, B | 16 Ultra2 LVD | 133mm (5.25in) HH | N[2] | - | 3551001[4] |
| **Tape Autoloaders** | | | | | | | |
| 00N7992 | 120/240GB DDS/4 Tape Autoloader[1] | A+B | 16 Ultra2 LVD | 133mm (5.25in) FH | N[2] | - | 3551001[4] |
| 3502108 | DLT Tape Autoloader | - | 16 | Desktop | Y | - | - |
| **External Tape Libraries[5]** | | | | | | | |
| 3502R14 | DLT Tape Library | - | 16 | Rack | Y | - | - |
| **External Tape Enclosures** | | | | | | | |
| 3510020 | External Half High SCSI Storage Enclosure[6] | - | 8, 16 | Desktop | N | N | - |
| 3551001 | NetMEDIA Storage Expansion Unit EL[7] | - | 16 | Rack | Y | N | - |
| 10L7113 | NetMEDIA Systems Management Adapter[8] | - | 16 LVD | - | N | N | 3551001 |
| **Associated Options** | | | | | | | |
| 10K2340 | Media Bay Tray and LVD Cable Kit[1, 4] | - | 16 LVD | Int | Y | N | 3551001 |
| 00N7956 | 68-pin External Multimode LVD/SE SCSI Terminator | - | 16 LVD/SE | Ext | y | N | 3510020 |

Note: xSeries 342 includes a single drop, 16-bit, single-ended, nonterminated SCSI cable for attachment of a device in Bay A or B to the second integrated Ultra160 SCSI channel or supported adapter. No external SCSI port is available. All tape drives and enclosures are supported by PCI Wide Ultra160 SCSI Adapter (P/N 19K4646) which has an external 0.8mm VHDCI connector.

1. LVD support for LVD devices requires installation of the 16-bit multi-mode terminated, two-drop, LVD SCSI cable included with optional Media Bay Tray and LVD Cable Kit (P/N 10K2340).
2. Termination requires installation of the multi-mode terminated, two-drop, LVD SCSI cable included with optional Media Bay Tray and LVD Cable Kit (P/N 10K2340).
3. Requires 68-pin External Multimode LVD/SE SCSI Terminator (P/N 00N7956).
4. LVD support for LVD devices installed in a NetMEDIA Storage Expansion Unit EL (P/N 3551001) requires replacement of the standard single-ended internal cables with one or more (depending on configuration) cables from Media Bay Tray and LVD Cable Kit (P/N 10K2340) which contains a single two-drop multi-mode terminated cable. If the standard cables are used for attachment to LVD devices, single-ended SCSI rules and bus speeds apply.
5. Tape library attributes and prerequisites are located in Appendix B: Tape Library Attributes.
6. Provides a black desktop 133mm (5.25in) half-high (HH) tape enclosure. Connector is configurable as 50-pin Centronix or 68-pin high density. Requires either tape drive self-termination or 68-pin External Multimode LVD/SE SCSI Terminator (P/N 00N7956).
7. NetMEDIA Storage Expansion Unit EL (P/N 3551001) is a black 3U, 19in rack mountable tape enclosure which includes two full- high (FH) or four- half high (HH) extended length 133mm (5.25in) bays, two external 68-pin high density connectors and two internal four-drop single-ended terminated 16-bit SCSI cables for device attachment. Two power supplies and two power cords are also included. Tip: The front rail clips will need to be reversed and screwed in from behind to secure the unit in a 930842x rack.
8. NetMEDIA Systems Management Adapter (P/N 10L7113) may be installed in a 3551001 to provide repeater function, LVDS interface, aggregate cable lengths up to 12m when attached to an LVD SCSI controller, and auto-termination when the 3551001 is powered off. External connector is 0.8mm VHDCI.

Note: Additional tape attributes can be found in Appendix A: Tape Drive Attributes.

# IBM xSeries 350

| Part Number | Processor Speed (MHz)[3] | Number of Processors (Std/Max) | L2 ECC Cache | Memory (Std/Max) (R = RDIMM) | Form Factor | Power Supply Quantity (Std/Max) | Hot-Swap (Power, Slots, HDD, Fans) | Redundancy (Optional, Standard) | Adv System Management Processor | Onboard Ethernet (Mbps) | SCSI Controller (Dual, Ultra, RAID) | Removable Media Bays (Total/Avail) | Internal Hard Disk Drive (Std/Max) | CD-ROM (IDE)[6] | Bays (Total/Avail) | Slots (Total/Avail) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **xSeries 350 At-A-Glance** | | | | | | | | | | | | | | | | |
| 8682-4RY[1] | 700 | 1/4 | 1MB | 512MB(R)/16GB[4] | Rack (4U) | 1/3 | P, S, H, F | S-Fans O-Power[5] | Y | 10/100 | D,U160 | 2/0 | 0/440.4GB | 48X-20X | 8/6[7] | 6/6 |
| 8682-4AX[1, 2] | 700 | 1/4 | 1MB | 512MB(R)/16GB[4] | Rack (4U) | 1/3 | P, S, H, F | S-Fans O-Power[5] | Y | 10/100 | D,U160 | 2/0 | 0/440.4GB | 48X-20X | 8/6[7] | 6/6 |
| 8682-5RY[1] | 700 | 1/4 | 2MB | 512MB(R)/16GB[4] | Rack (4U) | 1/3 | P, S, H, F | S-Fans O-Power[5] | Y | 10/100 | D,U160 | 2/0 | 0/440.4GB | 48X-20X | 8/6[7] | 6/6 |
| 8682-5AX[1, 2] | 700 | 1/4 | 2MB | 512MB(R)/16GB[4] | Rack (4U) | 1/3 | P, S, H, F | S-Fans O-Power[5] | Y | 10/100 | D,U160 | 2/0 | 0/440.4GB | 48X-20X | 8/6[7] | 6/6 |
| 8682-6RY[1, 8] | 900 | 1/4 | 2MB | 512MB(R)/16GB[4] | Rack (4U) | 1/3 | P, S, H, F | S-Fans O-Power[5] | Y | 10/100 | D,U160 | 2/0 | 0/440.4GB | 48X-20X | 8/6[7] | 6/6 |

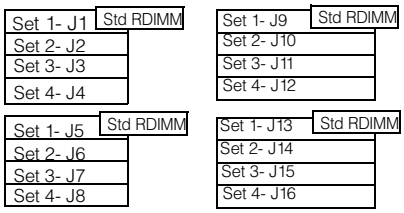
1. Housed in a 19in rack-mountable drawer and ships standard without a keyboard or mouse. See Rack Cabinets and Options section for supported IBM racks.
2. Installation of this model is recommended only to support attachment to iSeries systems. Contains an updated system board designed specifically to support the Integrated xSeries Adapter (IXA) for iSeries option.
3. Intel Pentium III Xeon processor with integrated full speed ECC L2 cache and 100MHz access to memory and I/O buses.
4. Advanced Chipkill ECC memory corrects two-, three-, and four-bit memory errors.
5. N+1 power supply redundancy requires a minimum of one optional 270W Hot-Swap Redundant Power Supply (P/N 37L6880). Robust configurations may require two. See "Power" under "xSeries 350 Power, Monitor & Accessories for additional information.
6. Variable read rate. Actual playback speed will vary and is often less than the maximum possible.
7. xSeries 350 includes three hot-swap bays. Optional 3-Pack Ultra 160 Hot-Swap Expansion Kit (P/N 33L5050) expands the total hot-swap bays to six.
8. The 6RY model system board supports attachment of the IXA adapter.

## xSeries 350 Processors

| Part Number | Processor Upgrades | SMP Support[1] | Processor Speed Upgrade[2] |
|---|---|---|---|
| 00N7946 | Netfinity 700MHz/1MB Upgrade with Pentium III Xeon Processor | 4RY, 4AX | - |
| 00N7944 | Netfinity 700MHz/2MB Upgrade with Pentium III Xeon Processor | 5RY, 5AX | 4RY, 4AX |
| 19K4633 | 900MHz/2MB Upgrade with Pentium III Xeon Processor | 6RY | 4xx, 5xx |

1. Three additional processors may be installed, providing a maximum of four. All processors must be identical in type, speed, and cache size.Processors must be installed in numerical order from slot one to slot four.
2. Requires removal of the standard processor. A maximum of four processors may be installed. All processors must be identical in type, speed and cache size. Upgrades may require a BIOS update. To obtain the latest Flash BIOS, access www.pc.ibm.com/support and enter machine "Type-Model" in Quick Path. Select "Downloadable files" then "BIOS."

## xSeries 350 Memory




All RDIMMs installed in each set must be the same size, but all the sets do not have to contain RDIMMs of the same size. Install RDIMM sets in numerical sequence from one to four.

| Total Memory[1] | Quantity of RDIMMs Added[2] | | | |
|---|---|---|---|---|
| | 128MB (33L3113) | 256MB (33L3115) | 512MB (33L3117) | 1GB (33L3119) |
| 512MB | 4 x 128 RDIMMs standard | - | - | - |
| 1GB | 4 | - | - | - |
| 1.5GB | - | 4 | - | - |
| 2GB | 4 | 4 | - | - |
| 2.5GB | - | 8 | - | - |
| 3GB | 4 | - | 4 | - |
| 4GB | 4 | 4 | 4 | - |
| 5GB | 4 | - | 8 | - |
| 6GB[3] | - | 8 | 8 | - |
| 7GB[3] | - | 4 | 12 | - |
| 8GB[3] | - | - | 16 | - |
| 9GB | 4 | - | - | 8 |
| 10GB[3] | - | - | 12 | 4 |
| 12GB[3] | - | - | 8 | 8 |
| 14GB[3] | - | - | 4 | 12 |
| 16GB[3] (max) | - | - | - | 16 |

This table does not represent all possible memory configurations. Memory modules may vary in price per MB. Selection of smaller RDIMMs may provide a more cost-effective alternative to using larger RDIMMs.

1. Network operating systems may limit the maximum amount of addressable memory. See operating system specifications for further information.
2. To obtain the quantity of memory identified in the "Total Memory" column, select the appropriate row and order the quantity of RDIMMs identified in all columns for that row. Example: For 2GB, order 4 x 33L3113 plus 4 x 33l3115.
3. Requires removal of standard RDIMMs.

| Part Number | Memory Description[1] |
|---|---|
| 33L3113 | Netfinity 128MB, 100MHz ECC SDRAM RDIMM |
| 33L3115 | Netfinity 256MB, 100MHz ECC SDRAM RDIMM |
| 33L3117 | Netfinity 512MB, 100MHz ECC SDRAM RDIMM |
| 33L3119 | Netfinity 1GB 100MHz ECC SDRAM RDIMM |

1. Due to four-way interleaving all RDIMMs installed in each set must be the same size, but all the sets do not have to contain RDIMMs of the same size. Install RDIMM sets in numerical sequence from one to four. Chipkill support is provided on the memory card.

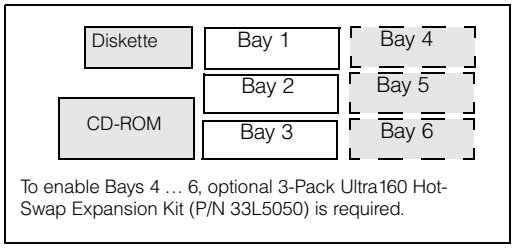
## xSeries 350 Hard Disk Drive (HDD) Storage

| Total Int Storage[1] | 7200RPM HDDs | | | 10,000RPM HDDs | | | | 15,000RPM HDDs | |
|---|---|---|---|---|---|---|---|---|---|
| | 9.1GB (37L7201) | 18.2GB (37L7202) | 36.4GB (37L7203) | 9.1GB (37L7204) | 18.2GB (37L7205) | 36.4GB (37L7206) | 73.4GB (06P5756) | 9.1GB (19K0655) | 18.2GB (19K0656) |
| 0GB | Standard on base models | | | | | | | | |
| 9.1GB | 1 | - | - | 1 | - | - | | 1 | - |
| 18.2GB | 2 | 1 | - | 2 | 1 | - | | 2 | 1 |
| 27.3GB | 3 | - | - | 3 | - | - | | 3 | - |
| 36.4GB | 4[2] | 2 | 1 | 4[2] | 2 | 1 | | 4[2] | 2 |
| 45.5GB | 5[2] | - | - | 5[2] | - | - | | 5[2] | - |
| 54.6GB | 6[2] | 3 | - | 6[2] | 3 | - | | 6[2] | 3 |
| 72.8GB | - | 4[2] | 2 | - | 4[2] | 2 | | - | 4[2] |
| 91GB | - | 5[2] | - | - | 5[2] | - | | - | 5[2] |
| 109.2GB | - | 6[2] | 3 | - | 6[2] | 3 | | - | 6[2] |
| 145.6GB | - | - | 4[2] | - | - | 4[2] | | - | - |
| 182GB | - | - | 5[2] | - | - | 5[2] | | - | - |
| 218.4GB | - | - | 6[2] | - | - | 6[2] | | - | - |
| 220.2GB | - | - | - | - | - | - | 3 | - | - |
| 293.6GB | - | - | - | - | - | - | 4[2] | - | - |
| 367GB | - | - | - | - | - | - | 5[2] | - | - |
| 440.4GB (max) | - | - | - | - | - | - | 6[2] | - | - |

This table does not represent all possible HDD configurations.
1. Select a total storage row and then select the quantity of HDDs from a column corresponding to the HDD of choice. Total Internal Storage listed is within +/- 0.2GB unless otherwise noted.
2. Requires IBM 3-Pack Ultra160 Hot-Swap Expansion Kit (P/N 33L5050).

| Bay | Form Factor | Height | Front Access | Usage |
|---|---|---|---|---|
| - | 89mm (3.5in) | SL | Yes | Diskette |
| - | 133mm (5.25in) | HH | Yes | IDE CD-ROM |
| 1 … 3 | HS | SL[1] | Yes | Open |
| 4 … 6[2] | HS | SL[1] | Yes | Open |

1. Half-high (HH) devices are NOT supported.
2. To enable Bays 4 … 6, optional 3-Pack Utra160 Hot-Swap Expansion Kit (P/N 33L5050) is required.



To enable Bays 4 … 6, optional 3-Pack Ultra160 Hot-Swap Expansion Kit (P/N 33L5050) is required.

| Part Number | Description | RPM | Height | Bays Supported[1] | Max Qty[1] |
|---|---|---|---|---|---|
| **Ultra160 Hard Disk Drives (HDD)** | | | | | |
| 37L7201 | 9.1GB Ultra160 SCSI Hot-Swap SL HDD | 7200 | SL | 1 … 6 | 6 |
| 37L7202 | 18.2GB Ultra160 SCSI Hot-Swap SL HDD | 7200 | SL | 1 … 6 | 6 |
| 37L7203 | 36.4GB Ultra160 SCSI Hot-Swap SL HDD | 7200 | SL | 1 … 6 | 6 |
| 37L7204 | 9.1GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD | 10000 | SL | 1 … 6 | 6 |
| 37L7205 | 18.2GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD | 10000 | SL | 1 … 6 | 6 |
| 37L7206 | 36.4GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD | 10000 | SL | 1 … 6 | 6 |
| 19K0655 | 9.1GB 15Krpm Ultra160 SCSI Hot-Swap HDD | 15000 | SL | 1 … 6 | 6 |
| 19K0656 | 18.2GB 15Krpm Ultra160 SCSI Hot-Swap HDD | 15000 | SL | 1 … 6 | 6 |
| 06P5756 | 73.4GB 10Krpm Ultra160 SCSI Hot-Swap SL HDD | 10000 | SL | 1 … 6 | 6 |
| **Associated Options** | | | | | |
| 33L5050 | IBM 3-Pack Ultra160 Hot-Swap Expansion Kit[2] | - | 3 x SL | 4 … 6 | - |

| | External Storage Expansion Units[3] | Form Factor |
|---|---|---|
| 35311RU | EXP300 Storage Expansion Unit[4] | Rack (3U) |
| 35601RU | FAStT EXP500 Storage Expansion Unit[5] | Rack (3U) |
| 35421RU | FAStT200 Storage Server[6, 7] | Rack (3U) |
| 35422RU | FAStT200 HA Storage Server[6] | Rack (3U) |
| 19K1121 | FAStT200 Redundant RAID Controller | - |

1. xSeries 350 ships with bays 1 … 3 enabled. To enable installation of greater than three HDDs requires IBM 3-Pack Ultra160 Hot-Swap Expansion Kit (P/N 33L5050).
2. IBM 3-Pack Ultra160 Hot-Swap Expansion Kit (P/N 33L5050) includes a hot-swap backplane and associated components that allow two ways to connect the expansion backplane. Within the option kit are two 16-bit LVD SCSI cables. One can be attached from the 3-Pack Ultra160 Hot-Swap backplane to the second connector of the onboard dual-channel Ultra160 SCSI controller, creating two independent buses. (Utilizing the second channel will eliminate the possibility of attaching external devices to that channel.) Using the repeater card included with the option kit, the other cable can be connected to the standard backplane, creating a single bus with six hot-swap HDD bays. Install tip: Do not route cabling over a memory card. If necessary, the longer standard SCSI cable can be disconnected from the standard backplane and connected to the backplane included in the expansion kit. Then the LVD SCSI cable that comes with the expansion kit would be connected to the standard backplane. Cabling can be routed either over or under the fans.
3. Not supported by the onboard external SCSI port. To configure one of the SCSI storage devices listed here, select an optional SCSI controller then refer to Appendix D: Cables - Storage Units - Controllers to confirm that the controller supports the desired External Storage Expansion Unit and to select a supported cable. For HDD or other expansion unit options, see the specific expansion unit section. For Fibre Channel storage devices, refer to the Fibre Array Solutions section.
4. EXP300 includes a single 2M Ultra2 SCSI cable and dual hot-swap 500W redundant power supplies, each with its own power cord.
5. FAStT EXP500 Storage Expansion Unit (P/N 35601RU) includes dual hot-swap 350W power supplies, each with its own power cord.
6. The FAStT200 includes two hot-swap, 350W auto-ranging redundant power supplies, each with its own power cord.
7. Can be upgraded to FAStT200 HA Storage Server through the addition of a FAStT200 Redundant RAID Controller (P/N 19K1121).

## xSeries 350 Internal SCSI Cabling

The xSeries 350 contains a DASD backplane supporting three hot-swap, SCA-2 compliant drive bays. The backplane is connected to one of the internal connectors of the integrated dual-channel Ultra160 SCSI controller through a 16-bit LVD SCSI cable. An optional Netfinity 3-Pack Ultra160 Hot-Swap Expansion Kit (P/N 33L5050) can be installed to provide additional internal HDD storage capacity. Within this option are two 16-bit LVD SCSI cables. One can be attached from the 3-Pack Ultra Hot-Swap backplane to the second connector of the dual-channel Ultra160 SCSI controller, the other, through the use of a repeater card included with the option, can be cabled directly to the standard backplane.

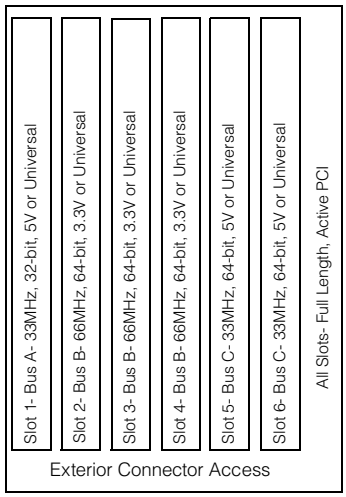
In configurations where external SCSI device attachment is required instead of additional internal HDD storage, a second 16-bit LVD SCSI cable is included with the server. One end of the cable can be attached to the second Ultra160 connector and the other is attached to the external 0.8mm VHDCI connector on the back of the chassis. This provides an external connection to support LVDS devices.

## xSeries 350 I/O Options

| Part Number | Description | Adapter Length | PCI Support[2] | Slots Supported[1, 2] | Hot-Plug[3] | PCI Voltage Key | MHz |
|---|---|---|---|---|---|---|---|
| | **Storage Controllers[4]** | | | | | | |
| 37L6091 | ServeRAID-4L Ultra160 SCSI Controller[5] | Full | 64-bit | 1 … 6 | X | Universal | 33 |
| 37L6080 | ServeRAID-4M Ultra160 SCSI Controller[6] | Full | 64-bit | 1 … 6 | X | Universal | 33 |
| 37L6889 | ServeRAID-4H Ultra160 SCSI Controller[7] | Full | 64-bit | 1 … 6 | X | Universal | 33 |
| 06P5736 | ServeRAID-4Mx Ultra160 SCSI Controller[8] | Full | 64-bit | 1 … 6 | X | Universal | 66 |
| 06P5740 | ServeRAID-4Lx Ultra160 SCSI Controller[9] | Half | 64-bit | 1 … 6 | X | Universal | 66 |
| 02K3454 | PCI Fast/Wide Ultra SCSI Adapter[24] | Half | 32-bit | 1, 5, 6 | - | 5 | 33 |
| 19K4646 | PCI Wide Ultra160 SCSI Adapter[10] | Half | 64-bit | 1 … 6 | - | Universal | 66 |
| | **Fiber Storage Controllers and Options[11]** | | | | | | |
| 00N6881 | Netfinity FAStT Host Adapter | Half | 64-bit | 1 … 6 | X | Universal | 66 |
| 35521RU | FAStT500 Storage Server | - | - | - | - | - | - |
| 35421RU | FAStT200 Storage Server | - | - | - | - | - | - |
| 35422RU | FAStT200 HA Storage Server | - | - | - | - | - | - |
| 35341RU | SAN Fibre Channel Managed Hub | - | - | - | - | - | - |
| 2109S08 | SAN Fibre Channel Switch, 8-Port | - | - | - | - | - | - |
| 2109S16 | SAN Fibre Channel Switch, 16-Port | - | - | - | - | - | - |
| 2108R3L | SAN Data Gateway Router Ultra SCSI LVD Port[12] | - | - | - | - | - | - |
| | **Networking[13]** | | | | | | |
| | **Ethernet[14]** | | | | | | |
| 09N9901 | Netfinity 10/100 EtherLink Server Adapter by 3Com[15] | Half | 32-bit | 1 … 6 | X | Universal | 33 |
| 19K4401 | Netfinity Gigabit Ethernet Adapter (copper) | Half | 64-bit | 1 … 6 | X | Universal | 33 |
| 06P3601 | 10/100 Ethernet Server Adapter[15] | Half | 32-bit | 1 … 6 | X | Universal | 33 |
| 06P3701 | Gigabit Ethernet SX Server Adapter (fiber) | Half | 64-bit | 1 … 6 | X | Universal | 66 |
| | **Token Ring** | | | | | | |
| 34L0701 | Token-Ring 16/4 PCI Adapter 2 with Wake on LAN[15] | Half | 32-bit | 1 … 6 | X | Universal | 33 |
| 34L5201 | High-Speed 100/16/4 Token-Ring PCI Management Adapter[15] | Half | 32-bit | 1 … 6 | X | Universal | 33 |
| | **Communications[16]** | | | | | | |
| 33L4618 | V.90 PCI Data/Fax Modem[17] | Half | 32-bit | 1, 5, 6 | - | 5 | 33 |
| 37L14xx | Serial I/O SST 8, 16, and 128 port adapters[18] | Half | 32-bit | 1, 5, 6[18] | - | 5 | 33 |
| | **Systems Management[19]** | | | | | | |
| 01K7209 | Netfinity Advanced System Management PCI Adapter[20] | Full | 32-bit | 1, 5, 6[21] | - | 5 | 33 |
| 03K9309 | Netfinity Advanced System Management Interconnect Cable Kit[22] | - | - | - | - | - | - |
| 36L9654 | Netfinity Advanced System Management Token-RIng Connection[23] | - | - | - | - | - | - |

1.The 5V - 33MHz slots support universal or 5V adapters. A universal voltage-66MHz adapter plugged into these slots will operate at 33MHz.The 3.3V slots support universal or 3.3V adapters. A universal voltage-33MHz adapter plugged into these slots limits a 66MHz PCI adapter installed on the same bus to 33MHz.
2. A 64-bit adapter installed into a 32-bit slot will transfer data at 32-bit rates. 33MHz adapters will reduce the speed in 66MHz buses to 33MHz.
3. All six slots are full-length hot-plug capable using IBM's Active PCI technology. For Network Operating System support, access www.pc.ibm.com/us/compat
4. xSeries 350 includes a dual-port, dual-channel Ultra160 SCSI controller. See "Internal SCSI Cabling" for cabling alternatives.
5. ServeRAID-4L Ultra160 SCSI controller is powered by a 100MHz Intel i960 processor and provides a single channel, 16MB of ECC cache and either one internal or one external Ultra160 connection. External connector is 0.8mm VHDCI.
6. ServeRAID-4M Ultra160 SCSI controller is powered by a 100MHz Intel i960 processor and provides two channels, 64MB of battery-backed ECC cache and two internal and two external Ultra160 connectors (only two connectors may be utilized). External connectors are 0.8mm VHDCI.
7. ServeRAID-4H Ultra160 SCSI controller is powered by a 266MHz PowerPC 750 processor and provides 128MB of battery-backed ECC cache with two internal and up to four external Ultra160 connectors (only four connectors may be utilized). External connectors are 0.8mm VHDCI.
8. ServeRAID-4Mx Ultra160 SCSI Controller is powered by a 100MHz Intel Zion GC80303 processor that provides 64MB of battery-backed ECC cache and two internal and two external Ultra160 connections (only two connectors may be used). External connections are 0.8mm VHDCI.
9. ServeRAID-4Lx Ultra160 SCSI Controller is powered by a 100MHz Intel Zion GC80303 processor and provides a single channel, 32MB of ECC cache and either one internal or one external Ultra160 connection. External connector is 0.8mm VHDCI.

10. PCI Wide Ultra160 SCSI Adapter (P/N 19K4646) provides a single channel with one internal connector, a five-drop multi-mode terminated LVD SCSI cable and one external 0.8mm VHDCI connector. Only one of the two connectors may be utilized.
11. See Fibre Array Solutions section for additional configuration information.
12. The 2108R3L SAN Data Gateway Router Ultra SCSI LVD port provides one integrated short-wave optical port and two SCSI ports for tape storage connections (LVD, HVD and single-ended).
13. xSeries 350 has an integrated 10/100 PCI Ethernet Controller.
14. In a fault-tolerant networking environment, using the fault-tolerant software delivered with the Ethernet adapters of a single manufacturer is recommended. Installing fault-tolerant solutions provided by multiple manufacturers may cause failures if the intermediate drivers provided with the adapters are not compatible. The onboard Ethernet is Intel-based, which is compatible with the two Intel-based optional Ethernet adapters (P/N 06P3601, 06P3701).
15. The Wake on LAN function of this option is not supported by this server.
16. xSeries 350 includes two USB ports, two serial and one parallel port.
17. Due to homologation variances, modem availability may differ by country.
18. See Appendix E for details on Serial I/O options and configuration limitations. A maximum of four Serial I/O adapters (any combination of P/Ns 37L1414, 37L1415, 37L1416, 37L1423) may be installed.
19. The Netfinity Advanced Systems Management Processor and Interconnect Bus integrated into xSeries 350 works with Netfinity Director to provide significant system management function. When used with optional Netfinity Advanced System Management PCI Adapter (P/N 01K7209) and Netfinity Advanced System Management Interconnect Cable Kit (P/N 03K9309) additional management and control of up to 12 service processors from a remote console through a single modem or LAN connection is possible.
20. Includes PCI adapter, Netfinity Advanced System Management Interconnect Cable Kit components and 56W AC adapter which requires a separate power source. Provides an integrated 10/100 Ethernet port and PCMCIA slot to support optional Netfinity Advanced System Management Token-Ring Connection (P/N 36L9654).
21. A maximum quantity of one is supported.
22. Required for all xSeries and Netfinity servers containing a standard Advanced System Management Processor that are to be interconnected for system management support through a LAN or modem connection. Optional Netfinity Advanced System Management PCI Adapter (P/N 01K7209) includes the contents of this option. Up to 12 service processors may be interconnected (including standard and optional processors) with an aggregate connection length of no more than 91.4m (300ft). A customer-supplied Ethernet cable is required for each interconnection.
23. Contains an IBM Turbo 16/4 Token-Ring PCI Card, which installs in the PCMCIA card slot of Netfinity Advanced System Management PCI Adapter, and a PC Card to 9-pin D-Shell cable which is routed to an available adapter slot opening (reduces available slots by one). The Netfinity Advanced System Management PCI Adapter's integrated Ethernet port and Netfinity Advanced System Management Token-Ring Connection cannot be connected or used together.
24. PCI Fast/Wide Ultra SCSI Adapter (P/N 02K3454) provides one external 68-pin high density connector that supports external SCSI devices such as tape enclosures.


Slot 1- Bus A- 33MHz, 32-bit, 5V or Universal
Slot 2- Bus B- 66MHz, 64-bit, 3.3V or Universal
Slot 3- Bus B- 66MHz, 64-bit, 3.3V or Universal
Slot 4- Bus B- 66MHz, 64-bit, 3.3V or Universal
Slot 5- Bus C- 33MHz, 64-bit, 5V or Universal
Slot 6- Bus C- 33MHz, 64-bit, 5V or Universal
All Slots- Full Length, Active PCI
Exterior Connector Access

## xSeries 350 Power, Monitors & Accessories

| Part Number | Description |
|---|---|
| | **Power[1]** |
| 37L6880 | 270W Hot-Swap Redundant Power Supply[2] |
| | **Uninterruptible Power Supply (UPS)[3]** |
| 94G6674 | APC Smart-UPS 1400RMB[4] |
| 94G6676 | APC Smart-UPS 3000RMB[4] |
| 37L6861 | APC Smart-UPS 5000RMB[5] |
| | **Monitors[6]** |
| 633347N | E51 Color Monitor 15in (350mm, 13.8in Viewable Image Size), stealth black[7] |
| 6331N2N | E54 Color Monitor 15in (350mm, 13.8in Viewable Image Size), stealth black[7] |
| 6332J1N | E74 Color Monitor 17in (403mm, 15.9in Viewable Image Size), stealth black[7] |
| 66274AN | G78 Color Monitor 17in (406.4mm, 16in Viewable Image Size), stealth black[7] |
| 9511AG4 | T540 Flat Panel Color Monitor 15in (381mm, 15in viewable image), stealth black[8] |

1. xSeries 350 systems include a single 270W, hot-swap power supply and two 9ft power cords, one high voltage IEC 320-C13 and one low voltage IEC 320-C13 to NEMA 5-15P. N+1 power supply redundancy may be achieved with the addition of optional 270W Hot-Swap Redundant Power Supply (P/N 37L6880). Redundancy for configurations of greater than 270W requires installation of a second optional supply. To assist in determining when an additional power supply is required to preserve redundancy, a "Non-Redundant LED" is a standard feature of the xSeries 350. The following table is provided as a reference.

| Number of Power Supplies | System Configuration Supported |
|---|---|
| | **Non-Redundant** |
| 1 | Up to two processors |
| | Up to three PCI adapters |
| | Up to three HDDs |
| | Up to eight memory RDIMMs |

2. 270W Hot-Swap Redundant Power Supply (P/N 37L6880) includes a single low voltage 9ft power cord.
3. For runtimes and UPS attributes see Appendix C: UPS Runtime Estimate.
4. Height is 3U. See Rack Cabinets and Options section for supported IBM racks.
5. Height is 5U. See Rack Cabinets and Options section for supported IBM racks.
6. xSeries 350 uses an SVGA controller (S3 Savage4 chipset) with 8MB of video memory.
7. Installation within a rack requires optional Monitor Compartment (P/N 94G7444).
8. Installation within a rack requires optional Netfinity Flat Panel Monitor Rack Mount Kit II (P/N 37L6888) and Netfinity Rack Keyboard Tray (P/N 28L4707). A space saver keyboard may coexist within the same 28L4707 keyboard tray.

| Part Number | Description |
|---|---|
| **Rack and NetBAY[1]** | |
| | Refer to the Rack Cabinets and Options section for information concerning IBM racks and rack-supported devices. |
| **Keyboard and Mouse[2]** | |
| 28L3644 | Space Saver II Keyboard[3, 4] |
| 01K1260 | TrackPoint IV 104-Key Black Keyboard[4, 5] |
| 28L3621 | Preferred Keyboard (stealth black)[5] |
| 28L3673 | Sleek 2-Button Stealth Black Mouse |

1. xSeries 350 is housed in a 19in rack-mountable drawer and requires one of the racks listed in the Rack Cabinets and Options section.
2. xSeries 350 supports rack configurations only and ships without a keyboard or mouse.
3. Installation within a rack requires optional keyboard tray (P/N 28L4707), which stows in "ready-to-use" position.
4. Advanced TrackPoint IV features are not available on IBM xSeries or Netfinity systems.
5. Installation within a rack requires optional keyboard tray P/N 28L4707. This keyboard cannot share a keyboard tray with a flat panel display.

## xSeries 350 Tape Options

| Part Number | Tape Drives | Bays Supported[1] | SCSI Interface (bit) | Form Factor | Termination Included | 68/50-pin Converter Incl | Ext Tape Enclosures |
|---|---|---|---|---|---|---|---|
| 00N7991 | 20/40GB DDS/4 4mm Internal Tape Drive | - | 16 Ultra2 LVD | 89mm (3.5in) HH or 133mm (5.25in) HH | N | - | 3551001[2] |
| 09N4040 | 20/40GB DLT Internal SCSI Tape Drive | - | 8 | 133mm (5.25in) FH | N | Y | 3551001 |
| 00N7990 | 40/80GB DLT Internal SCSI Tape Drive | - | 16 Ultra2 LVD | 133mm (5.25in) FH | N | - | 3551001[2] |
| 00N8017 | 60/120GB 8mm M2 SCSI Tape Drive | - | 16 Ultra2 LVD | 133mm (5.25in) HH | N | - | 3551001[2] |
| 00N8016 | 100/200GB LTO Tape Drive | - | 16 Ultra2 LVD | 133mm (5.25in) FH | N | - | 3551001[2] |
| 24P2396 | 100/200GB LTO Half-High Tape Drive | - | 16 Ultra2 LVD | 133mm (5.25in) HH | N | - | 3551001[2] |
| **Tape Autoloaders** | | | | | | | |
| 00N7992 | 120/240GB DDS/4 Tape Autoloader | - | 16 Ultra2 LVD | 133mm (5.25in) FH | N | - | 3551001[2] |
| 3600109 | 3600 Series 900GB/1.8TB LTO Tape Autoloader[3] | - | 16 Ultra2 LVD | Tower or 6U Rack | Y | - | - |
| **External Tape Libraries[4]** | | | | | | | |
| 3502R14 | DLT Tape Library | - | 16 | Rack | Y | - | - |
| 3570C2x | Magstar MP 3570 Tape Subsystem | - | HVD | 6U Rack | Y | - | - |
| 3600220 | 3600 Series 2/4TB LTO Tape Library (Tower) | - | 16 Ultra2 LVD | Tower | Y | - | - |
| 3600R20 | 3600 Series 2/4TB LTO Tape Library (Rack) | - | 16 Ultra2 LVD | 5U Rack | Y | - | - |
| 3600LXU | 3600 Series 2-Drive, 20-Cartridge Expander Module[5] | - | 16 Ultra2 LVD | 5U Rack | Y | - | - |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 09N4048 | 3600 Series LTO Drive Upgrade Option[6] | - | 16 Ultra2 LVD | - | N | - | - |
| **External Tape Enclosures** | | | | | | | |
| 3551001 | NetMEDIA Storage Expansion Unit EL[7] | - | 16 | Rack | Y | N | - |
| 10L7113 | NetMEDIA Systems Management Adapter[8] | - | 16 LVD | - | N | N | 3551001 |
| **Associated Options** | | | | | | | |
| 10K2340 | Media Bay Tray and LVD Cable Kit[2] | - | 16 LVD | Int. | Y | N | 3551001 |

1. IBM xSeries 350 does not support internal tape drives. An external tape or tape enclosure must be used. If not used internally, the second integrated Ultra160 connector may be routed to an external 0.8mm VHDCI connector with a cable included with the server. All tape drives and enclosures are supported by PCI Wide Ultra160 SCSI Adapter (P/N 19K4646) which has an external 0.8mm VHDCI connector. Select tape drive, enclosure and controller then use Appendix D: Cables-Storage Units-Controllers to select an appropriate external cable.
2. LVD support for LVD devices installed in a NetMEDIA Storage Expansion Unit EL (P/N 3551001) requires replacement of the standard single-ended internal cables with one or more (depending on configuration) cables from Media Bay Tray and LVD Cable Kit (P/N 10K2340) which contains a single two-drop multi-mode terminated cable. If the standard cables are used for attachment to LVD devices, single-ended SCSI rules and bus speeds apply.
3. If installed in a rack, a fixed shelf is required. Allow an additional 1U for the fixed shelf. One unit only per shelf is supported.
4. Tape library attributes and prerequisites are located in Appendix B: Tape Library Attributes.
5. Supported only with the 3600 Series LTO Tape Library (rack) (P/N3600R20). Allow one additional EIA space when installing either one or two (maximum) units to accommodate a filler plate for cable routing. Up to two 3600 Series LTO Drive Upgrade Options can be installed in each module or the module can operate off the LTO drives installed in the LTO tape library.
6. Install in second drive bay of 3600 Series LTO Tape Libraries or in either of the two bays of 3600 Series 2-drive, 20-cartridge Expander Module to increase performance. Includes an LTO (Ultrium) drive and a one-meter external LVD SCSI cable.
7. NetMEDIA Storage Expansion Unit EL (P/N 3551001) is a black 3U, 19in rack mountable tape enclosure which includes two full-high (FH) or four half-high (HH) extended length 133mm (5.25in) bays, two external 68-pin high density connectors and two internal four-drop single-ended terminated 16-bit SCSI cables for device attachment. Two power supplies and two power cords are also included. Tip: The front rail clips will need to be reversed and screwed in from behind to secure the unit in a 930842x rack.
8. NetMEDIA Systems Management Adapter (P/N 10L7113) may be installed in a 3551001 to provide repeater function, LVDS interface, aggregate cable lengths up to 12M when attached to an LVD SCSI controller, and auto-termination when the 3551001 is powered off. External connector is 0.8mm VHDCI.

Note: Additional tape attributes can be found in Appendix A: Tape Drive Attributes.

## xSeries 350 Sample Configurations

Note: The following sample configurations are for illustration only and may not be suitable for any specific customer installation. Contact your IBM Business Partner or IBM Marketing Representative for assistance with your specific configuration requirements.

### Internet Server

| Part Number | Description | Quantity |
|---|---|---|
| 8682-4RY | xSeries 350 Pentium III Xeon 700/1MB, 512MB(R) ECC, Open, 48X, PCI (Rack 4U) | 1 |
| 37L6091 | ServeRAID-4L Ultra160 SCSI Controller | 1 |
| 33L5050 | 3-Pack Ultra160 Hot-Swap Expansion Kit | 1 |
| 37L7204 | Netfinity 9.1GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD | 4[1] |
| 00N8017 | 60/120GB 8mm M2 SCSI Tape Drive | 1 |
| 10K2340 | Media Bay Tray and LVD Cable Kit | 1 |
| 3551001 | NetMEDIA Storage Expansion Unit EL | 1 |
| 03K9310 | 2M External Ultra2 SCSI Cable | 1 |
| 6331N2N | E54 Color Monitor 15in (350mm, 13.8in Viewable Image Size), stealth black | 1 |
| 94G6674 | APC Smart-UPS 1400RMB | 1 |
| **Industry Standard 19in Rack, EIA-310D, min depth of 28in (711mm)** | | |
| 9306200 | Netfinity NetBAY22 | 1 |
| 28L3644 | Space Saver II Keyboard | 1 |
| 94G6670 | Blank Filler Panel Kit | 2 |

1. Four HDDs are used for RAID 5 protection. One HDD is identified as a hot-spare. Effective capacity is two HDDs or 18.2GB

An Internet server handles all requests from the Internet (Intranet or Extranet). Usually, this type of server has the same characteristics as a file server. The main difference is that an internet server talks a different language (TCP/IP vs NETBEUI or IPX/SPX) and often needs to do an extra security check (firewall). In the case of an Internet server, the server itself talks mostly to one client, the Internet Service Provider (ISP), instead of many clients as a file server does.

With this in mind, the IBM xSeries 350 was selected to provide an affordable price point for the growing Internet server market, featuring 512MB of system memory (expandable to 16GB), availability features such as RAID-protected internal hot-swap storage and power protection with an APC Smart-UPS.

The network configuration depends on the method that will be used to connect the server to the Internet. Usually fast ethernet routers are used, but if other methods are used, you can add the appropriate adapter. The configuration includes a tape backup unit for secure backup of critical data in the event of a system or storage failure.

### Application Server

| Part Number | Description | Quantity |
|---|---|---|
| 8682-5RY | xSeries 350 Pentium III Xeon 700/2MB, 512MB(R) ECC, Open, 48X, PCI (Rack 4U) | 1 |
| 00N7944 | Netfinity 700MHz/2MB Upgrade with Pentium III Xeon Processor | 3 |
| 33L3113 | Netfinity 128MB, 100MHz ECC SDRAM RDIMM | 4[1] |
| 33L3115 | Netfinity 256MB, 100MHz ECC SDRAM RDIMM | 4[1] |
| 33L5050 | 3-Pack Ultra160 Hot-Swap Expansion Kit | 1 |
| 37L7206 | 36.4GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD | 4[2] |
| 37L6080 | ServeRAID-4M Ultra160 SCSI Controller | 1 |
| 00N7990 | 40/80GB DLT Internal SCSI Tape Drive | 1 |
| 10K2340 | Media Bay Tray and LVD Cable Kit | 1 |
| 3551001 | NetMEDIA Storage Expansion Unit EL | 1 |
| 10L7113 | NetMEDIA Systems Management Adapter | 1 |
| 03K9310 | Netfinity 2M Ultra2 SCSI Cable | 1 |
| 6331N2N | E54 Color Monitor 15in (350mm, 13.8in Viewable Image Size), stealth black | 1 |
| 94G6674 | APC Smart-UPS 1400RMB | 1 |
| 37L6880 | Netfinity 270W Hot-Swap Redundant Power Supply | 2 |
| **Industry Standard 19in Rack, EIA-310D, min depth of 28in (711mm)** | | |
| 9306200 | Netfinity NetBAY22™ | 1 |
| 28L3644 | Space Saver II Keyboard | 1 |
| 94G6670 | Blank Filler Panel Kit | 2 |

1. For a total of 2GB of system memory.
2. Four HDDs are used for RAID 5 protection. Effective capacity is three HDDs or 109.2GB

An application server is designed to handle a high workload while providing application serving requirements for users. With this in mind, the xSeries 350 was selected to provide an affordable price point for an application server with four-way Pentium III Xeon processing, 2GB of system memory (expandable to 16GB), and availability features such as battery-backed cache RAID-protected internal hot-swap storage and power protection with an APC Smart-UPS.

# IBM xSeries 370

| Part Number | Processor Speed (MHz)[2] | Number of Processors (Std/Max) | L2 ECC Cache | Memory (Std/Max) (R=RDIMM) | Form Factor | Power Supply Quantity (Std/Max) | Hot-Swap (Power, Slots, HDD, Fans) | Redundancy (Optional, Standard) | Adv System Management Processor[3] | Onboard Ethernet (Mbps) | SCSI Controller (Dual, Ultra, RAID) | Removable Media Bays (Total/Avail) | Internal Hard Disk Drive (Std/Max) | CD-ROM (IDE)[4] | Bays (Total/Avail) | Slots (Total/Avail) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **xSeries 370 At-A-Glance** | | | | | | | | | | | | | | | | |
| 8681-1RX[1] | 700 | 1/8 | 1MB | 512MB[R]/32GB | Rack (8U) | 3/3 | P, S, H, F | S-Fans, S-Power | Y | - | D, U2 | 2/0 | 0/146.8GB | 48X-20X | 4/2 | 12/12 |
| 8681-2RX[1] | 700 | 1/8 | 2MB | 512MB[R]/32GB | Rack (8U) | 3/3 | P, S, H, F | S-Fans, S-Power | Y | - | D, U2 | 2/0 | 0/146.8GB | 48X-20X | 4/2 | 12/12 |
| 8681-3RX[1] | 900 | 1/8 | 2MB | 512MB[R]/32GB | Rack (8U) | 3/3 | P, S, H, F | S-Fans, S-Power | Y | - | D, U2 | 2/0 | 0/146.8GB | 48X-20X | 4/2 | 12/12 |

1. Housed in a 19in rack-mountable drawer and ships standard without a keyboard or mouse. See Rack Cabinets and Options section for supported IBM racks.
2. Intel Pentium III Xeon processor with integrated full-speed ECC L2 cache and 100 MHz access to memory and I/O buses.
3. xSeries 370 includes a systems management adapter equivalent to the one shipped with option 01K7209 (Netfinity Advanced System Management PCI Adapter).
4. Variable read rate. Actual playback speed will vary and is often less than the maximum possible.

## xSeries 370 Processors

| Part Number | Processor Upgrades[1] | SMP Support[2] | Processor Speed/Cache Upgrade[3] |
|---|---|---|---|
| 10K2330 | Netfinity 8500R 700MHz/1MB Upgrade with Pentium III Xeon Processor | 1RX | - |
| 10K2166 | Netfinity 8500R 700MHz/2MB Upgrade with Pentium III Xeon Processor | 2RX | 1RX |
| 19K4637 | xSeries 370 900MHz/2MB Upgrade with Pentium III Xeon Processor | 3RX | 1RX, 2RX |
| 10K2335 | Netfinity 4X Accelerator Filter | 1 … 3RX[4] | 1RX, 2RX |
| 10K2337 | Netfinity Mezzanine Expansion Kit | 1 … 3RX[4] | 1RX, 2RX |

1. xSeries 370 architecture optimizes memory and bus performance using a 100MHz, five-port crossbar core chipset. Up to eight Pentium III Xeon processors are supported on two 100MHz P-6 CPU buses. The recommended order of processor installation is: Sockets A1, A3, A2, A4, B1, B3, B2, B4.
2. Up to seven additional processors may be installed, providing a maximum of eight. All processors must be identical in type, speed, and cache size. The fifth through eighth processors require a Netfinity Mezzanine Expansion Kit (P/N 10K2337)
3. Requires removal of the standard processor(s). A maximum of eight processors may be installed. Installation of greater than four processors requires the addition of a mezzanine board and two cache coherency filters. Required options which provide the board and filters vary by model. For more information refer to "Processor Upgrade Requirements." All processors must be identical in type, speed and cache size. Upgrades may require a BIOS update. To obtain the latest Flash BIOS, access www.pc.ibm.com/support and enter machine "Type-Model" in Quick Path. Select "Downloadable files" and then "BIOS."
4. The fifth through eigth processors require this option. See "Processor Upgrade Requirements" for more information on when this option is required.

### Processor Upgrade Requirements[1, 2]

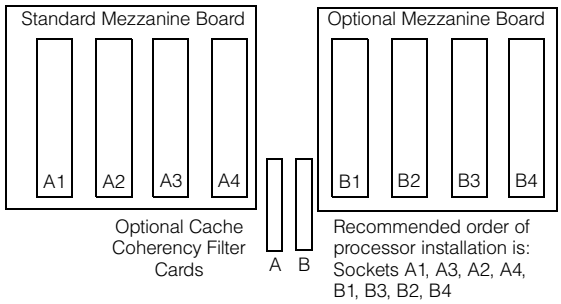
| | Upgrade To | | | |
|---|---|---|---|---|
| **Upgrade From** | ≤ 4 x 550MHz processors | > 4 x 550MHz processors | ≤ 4 x 700, 900MHz processors | > 4 x 700, 900MHz processors |
| ≤ 4 x 550MHz processors | - | 1 x 28L4730 or 1 x 28L4727 | 1 x 10K2337[3] | 1 x 10K2335, 2 x 10K2337[3] |
| > 4 x 550MHzprocessors | n/a | - | 1 x 10K2337[3, 4] | 2 x 10K2337[3, 5] |
| ≤ 4 x 700, 900MHz processors | n/a | n/a | - | 1 x 10K2335, 1 x 10K2337 |

1. This table does not address the processor part numbers required. It does address the optional Enablement Kit, Filters, and Mezzanine Board part numbers required. 900MHz processors can be substituted for 700MHz processors in this table.
2. All processors must be identical in type, speed, and cache size. Upgrades may require a BIOS update. To obtain the latest Flash BIOS, access www.pc.ibm.com/support and enter machine "Type-Model" in Quick Path. Select "Downloadable files" then "BIOS."
3. Remove the standard processor mezzanine board.
4. Remove all optional Enablement Kit components.
5. Remove Enablement Kit mezzanine board. The Enablement Kit 4X cache coherency filters are supported for use with Netfinity Mezzanine Expansion Kit (P/N 10K2337).

xSeries 370 ships with a single mezzanine board containing four Pentium III Xeon processor sockets with terminators in the unoccupied sockets. An additional mezzanine board may be added, expanding the number of processor sockets to eight. The two mezzanine boards are then linked through two cache coherency filter cards, one for each mezzanine board.

### Option Content

**xSeries 370 / Netfinity 8500R > 4-Way Enablement Kits**
(P/N 28L4730 and P/N 28L4727)
- Support for 550MHz models only
- Required for installation of processors 5 … 8.
- One Processor Mezzanine Board
- Two cache coherency filter modules
  - 28L4730 economical 1X (256K entries)
  - 28L4727 high performance 4X (1M entries)
  - Filters may be used with Mezzanine Expansion Kit (P/N 10K2337)




Optional Cache Coherency Filter Cards

Recommended order of processor installation is: Sockets A1, A3, A2, A4, B1, B3, B2, B4

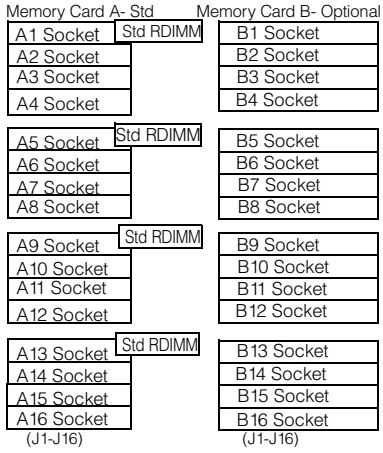
**Netfinity 4X Accelerator Filter (P/N 10K2335)**
- Two cache coherency filter modules
- Requires Mezzanine Kit (P/N 10K2337)

**Netfinity Mezzanine Expansion Kit (P/N 10K2337)**
- One Processor Mezzanine Board
- Supports cache coherency filters from the following options:
  - P/N 10K2335
  - P/N 28L4730
  - P/N 28L4727
- Supports 700MHz and above processors only
- Required when upgrading models 8681-4RY … 6RY to 700MHz or above
- Required when adding fifth through eighth processors rated at 700MHz or above

All installed processors must be identical in type, speed and cache size. Upgrades may require a BIOS update. To obtain the latest Flash BIOS, access www.pc.ibm.com/support and enter machine "Type-Model" in Quick Path. Select "Downloadable files" then "BIOS."

## xSeries 370 Memory

| Total System Memory | Quantity of RDIMMs Added | | | |
|---|---|---|---|---|
| **Std Models** | | | | |
| **512MB (4 x 128)** | **128MB (20L0245)** | **256MB (20L0247)** | **512MB (20L0249, 33L3149[7])** | **1GB (33L3056)** |
| 640 | 1 | - | - | - |
| 768 | 2 or | 1 | - | - |
| 1024 | 4 or | 2 or | 1 | - |
| 1280 | 6 or | 3 | - | - |
| 1536 | 8 or | 4 or | 2 or | 1 |
| 1792 | 10 or | 5 | - | - |
| 2048 | 12 or | 6 or | 3 | - |
| 2560 | 16[2] or | 8 or | 4 or | 2 |
| 2816 | 18[2] or | 9 | - | - |
| 3072 | 20[2] or | 10 or | 5 | - |
| 3328 | 22[2] or | 11 | - | - |
| 3584 | 24[2] or | 12 or | 6 or | 3 |
| 4096 | 28[2] or | 14[4] or | 7 | - |
| 4608 | - | 16[2] or | 8 or | 4 |
| 5120 | - | 18[2] or | 9 | - |
| 5632 | - | 20[2] or | 10 or | 5 |
| 6144 | - | 22[2] or | 11 | - |
| 6656 | - | 24[2] or | 12 or | 6 |
| 7680 | - | 28[2] or | 14[4] or | 7 |
| 8192 | - | 32[2, 3] or | 16[3] or | 8[3] |
| 8704 | - | - | 16[2] or | 8 |
| 9728 | - | - | 18[2] or | 9 |
| 10752 | - | - | 20[2] or | 10 |
| 11776 | - | - | 22[2] or | 11 |
| 12800 | - | - | 24[2] or | 12 |
| 13824 | - | - | 26[2] or | 13 |




Recommended order of RDIMM population for optimum cooling: 1, 5, 9, 13, 3, 7, 11, 15, 2, 6, 10, 14, 4, 8, 12, 16.

| | | | | |
|---|---|---|---|---|
| 14848 | - | - | 28[2] or | 14[4] |
| 15488 | - | - | - | 15[6] |
| 16384 | - | - | 32[2, 3] or | 16[3] |
| 16896 | - | - | - | 16[2] |
| 18944 | - | - | - | 18[2] |
| 20992 | - | - | - | 20[2] |
| 23040 | - | - | - | 22[2] |
| 25088 | - | - | - | 24[2] |
| 27136 | - | - | - | 26[2] |
| 29184 | - | - | - | 28[2] |
| 30720 | - | - | - | 30[5] |
| 32768 | - | - | - | 32[3] |

This table does not represent all possible memory configurations. Memory modules may vary in price per MB. Selection of smaller RDIMMs may provide a more cost-effective alternative to using larger RDIMMs.

NOTE: Cache line interleaving may be enabled by installing Netfinity 8500R Memory Expansion Card (P/N 28L4454) with as few as two RDIMMs. Matched pairs must be installed if the memory expansion card is present.
1. Network operating systems may limit the maximum amount of addressable memory. See the operating system specifications for further information.
2. Netfinity 8500R Memory Expansion Card (P/N 28L4454) is required for installation of greater than 16 RDIMMs.
3. Requires removal of standard memory.
4. Models with 4 x 128 RDIMMs standard require Netfinity 8500R Memory Expansion Card (P/N 28L4454) for installation of greater than 16 RDIMMs.
5. Requires removal of all but two of the standard RDIMMs.
6. Requires removal of all but one of the standard RDIMMs.
7. When P/N 33L3149 is installed in servers that have been upgraded with an optional memory card, RDIMMs must match in slot pairs from one card to another (size, capacity and type).

| Part Number | Memory Description[1] |
|---|---|
| 20L0245 | Netfinity 128MB SDRAM ECC RDIMM II |
| 20L0247 | Netfinity 256MB SDRAM ECC RDIMM II |
| 20L0249 | Netfinity 512MB SDRAM ECC RDIMM II |
| 28L4454 | Netfinity 8500R Memory Expansion Card[2] |
| 33L3056 | Netfinity 1GB SDRAM ECC RDIMM II |
| 33L3149 | 512MB 100MHZ ECC SDRAM RDIMM[3] |

1. xSeries 370 includes a single memory card with the ability to support up to 16GB of memory. All models contain four standard RDIMMs. For memory installation of greater than 16GB, Netfinity 8500R Memory Expansion Card (P/N 28L4454) is required. Installation of memory on systems containing a single memory card (standard on all models) has no restrictions on size or placement. When Netfinity 8500R Memory Expansion Card (P/N 28L4454) is installed, the memory RDIMM in each socket of Card A must match the RDIMM in the same socket on Card B. To enable cache line interleaving, both memory cards must be installed and configured identically.
2. Required for enablement of cache line interleaving or installation of greater than 16 RDIMMs. Configuration of the standard memory card (Card A) and optional 28L4454 (Card B) must be identical.
3. Due to the new technology used by 512MB 100MHz ECC SDRAM RDIMM (P/N 33L3149), it should not be matched with Netfinity 512MB SDRAM ECC RDIMM II (P/N 20L0249) when populating Memory Card B.

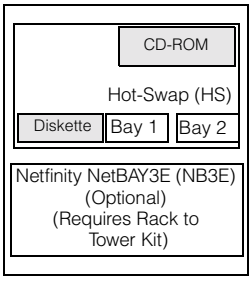
## xSeries 370 Hard Disk Drive (HDD) Storage

| Total Internal Storage[1] | 7200RPM HDDs | | | 10,000RPM HDDs | | | | 15,000RPM HDDs | |
|---|---|---|---|---|---|---|---|---|---|
| | 9.1GB 37L7201[2] | 18.2GB 37L7202[2] | 36.4GB 37L7203[2] | 9.1GB 37L7204[2] | 18.2GB 37L7205[2] | 36.4GB 37L7206[2] | 73.4GB 06P5756[2] | 9.1GB 19K0655[2] | 18.2GB 19K0656[2] |
| 0GB | Standard on base models | | | | | | | | |
| 9.1GB | 1 | - | - | 1 | - | - | | 1 | - |
| 18.2GB | 2 | 1 | - | 2 | 1 | - | | 2 | 1 |
| 36.4GB | - | 2 | 1 | - | 2 | 1 | | - | 2 |
| 72.8GB | - | - | 2 | - | - | 2 | | - | - |
| 73.4GB | - | - | - | - | - | - | 1 | - | - |
| 146.8GB | - | - | - | - | - | - | 2 | - | - |

This table does not represent all possible HDD configurations.
1. Select a total storage row and then select the quantity of HDDs from a column corresponding to the HDD of choice. Total Internal Storage listed is within +/- 0.2GB unless otherwise noted.
2. xSeries 370 contains an Ultra2 hot-swap backplane which limits Ultra160 HDDs to Ultra2 bus speeds.

| Bay | Form Factor | Height | Front Access | Usage |
|---|---|---|---|---|
| - | 133mm (5.25in) | HH | Yes | IDE CD-ROM |
| - | 89mm (3.5in) | SL | Yes | Diskette |
| 1 … 2 | HS | HH | Yes | Open |
| NB3E[1] | 19in Rack | 3U | Yes | Open |

1. A total of three optional 3U NetBAY3Es can be stacked beneath an xSeries 370 which has Netfinity 8Ux28D Rack-to-Tower Kit (P/N 28L4705) installed. See IBM Netfinity NetBAY3x Stackable Enclosure section for supported devices.




| Part Number | Description | RPM | Height | Bays Supported | Max Qty |
|---|---|---|---|---|---|
| | **Ultra160 HDDs[1]** | | | | |
| 37L7201 | 9.1GB Ultra160 SCSI Hot-Swap SL HDD | 7200 | SL | 1, 2 | 2 |
| 37L7202 | 18.2GB Ultra160 SCSI Hot-Swap SL HDD | 7200 | SL | 1, 2 | 2 |
| 37L7203 | 36.4GB Ultra160 SCSI Hot-Swap SL HDD | 7200 | SL | 1, 2 | 2 |
| 37L7204 | 9.1GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD | 10000 | SL | 1, 2 | 2 |
| 37L7205 | 18.2GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD | 10000 | SL | 1, 2 | 2 |
| 37L7206 | 36.4GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD | 10000 | SL | 1, 2 | 2 |
| 19K0655 | 9.1GB 15Krpm Ultra160 SCSI Hot-Swap HDD | 15000 | SL | 1, 2 | 2 |
| 19K0656 | 18.2GB 15Krpm Ultra160 SCSI Hot-Swap HDD | 15000 | SL | 1, 2 | 2 |
| 06P5756 | 73.4GB 10Krpm Ultra160 SCSI Hot-Swap SL HDD | 10000 | SL | 1, 2 | 2 |
| | **External Storage Expansion Units[2]** | **Form Factor** | | | |
| 35311RU | EXP300 Storage Expansion Unit[3] | Rack (3U) | | | |
| 09N7296 | EXP300 Rack-to-Tower Conversion Kit | - | | | |
| 35601RU | FAStT EXP500 Storage Expansion Unit[4] | Rack (3U) | | | |
| 35421RU | FAStT200 Storage Server[5, 6] | Rack (3U) | | | |
| 35422RU | FAStT200 HA Storage Server[5] | Rack (3U) | | | |
| 19K1121 | FAStT200 Redundant RAID Controller | - | | | |

1. xSeries 370 contains an Ultra2 hot-swap backplane which limits Ultra160 HDDs to Ultra2 bus speeds.
2. Not supported by the onboard external SCSI port. To configure one of the SCSI storage devices listed here, select an optional SCSI controller then refer to Appendix D: Cables - Storage Units - Controllers to confirm that the controller supports the desired External Storage Expansion Unit and to select a supported cable. For HDD or other expansion unit options, see the specific expansion unit section. For Fibre Channel storage devices, refer to the Fibre Array Solutions section.
3. EXP300 includes a single 2M Ultra2 SCSI cable and dual hot-swap 500W redundant power supplies, each with its own power cord. To convert an EXP300 to a tower form factor, Netfinity EXP300 Rack-to-Tower Conversion Kit (P/N 09N7296) is required.
4. FAStT EXP500 Storage Expansion Unit (P/N 35601RU) includes dual hot-swap 350W power supplies, each with its own power cord.
5. The FAStT200 includes two hot-swap, 350W auto-ranging redundant power supplies, each with its own power cord.
6. Can be upgraded to FAStT200 HA Storage Server through the addition of a FAStT200 Redundant RAID Controller (P/N 19K1121).

## xSeries 370 Internal SCSI Cabling

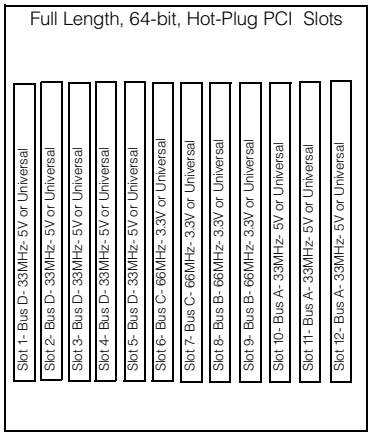
xSeries 370 systems contains an LVDS backplane supporting two hot-swap drive bays that support installation of up to two 3.5in, slim-high or half-high HDDs. The backplane is connected to the internal Wide Ultra2 SCSI controller through a 16-bit LVD SCSI cable. RAID support for the internal hot-swap drive bays is provided by adding a supported RAID adapter and moving the standard SCSI cable from the onboard controller to the optional RAID controller. The standard external Wide Ultra2 SCSI port uses a 0.8mm Very High Density Connector Interface (VHDCI).

## xSeries 370 I/O Options

| Part Number | Description | Adapter Length | PCI Support[2] | Slots Supported[1, 2] | Hot-Plug[3] | PCI Voltage Key | MHz |
|---|---|---|---|---|---|---|---|
| | **Storage Controllers[4]** | | | | | | |
| 37L6091 | ServeRAID-4L Ultra160 SCSI Controller[5] | Full | 64-bit | 1 … 12 | X | Universal | 33 |
| 37L6080 | ServeRAID-4M Ultra160 SCSI Controller[6] | Full | 64-bit | 1 … 12 | X | Universal | 33 |
| 37L6889 | ServeRAID-4H Ultra160 SCSI Controller[7] | Full | 64-bit | 1 … 12 | X | Universal | 33 |
| 06P5736 | ServeRAID-4Mx Ultra160 SCSI Controller[8] | Full | 64-bit | 1 … 12 | X | Universal | 66 |
| 06P5740 | ServeRAID-4Lx Ultra160 SCSI Controller[9] | Half | 64-bit | 1 … 12 | X | Universal | 66 |
| 19K4646 | PCI Wide Ultra160 SCSI Adapter[10] | Half | 64-bit | 1 … 12 | - | Universal | 66 |
| 02K3454 | PCI Fast/Wide Ultra SCSI Adapter[25] | Half | 32-bit | 1 … 5, 10 … 12 | - | 5 | 33 |
| | **Fibre Storage Controllers and Options[11]** | | | | | | |
| 00N6881 | Netfinity FAStT Host Adapter | Half | 64-bit | 1 … 12 | X | Universal | 66 |
| 35521RU | FAStT500 Storage Server | - | - | - | - | - | - |
| 35421RU | FAStT200 Storage Server | - | - | - | - | - | - |
| 35422RU | FAStT200 HA Storage Server | - | - | - | - | - | - |
| 35341RU | SAN Fibre Channel Managed Hub | - | - | - | - | - | - |
| 2109S08 | SAN Fibre Channel Switch, 8-Port | - | - | - | - | - | - |
| 2109S16 | SAN Fibre Channel Switch, 16-Port | - | - | - | - | - | - |
| 2108R3L | SAN Data Gateway Router Ultra SCSI LVD Port[12] | - | - | - | - | - | - |
| | **Networking[13]** | | | | | | |
| | **Ethernet[14]** | | | | | | |
| 09N9901 | 10/100 EtherLink Server Adapter by 3Com[15] | Half | 32-bit | 1 … 12 | X | Universal | 33 |
| 19K4401 | Netfinity Gigabit Ethernet Adapter (copper) | Half | 64-bit | 1 … 12 | X | Universal | 33 |
| 06P3601 | 10/100 Ethernet Server Adapter[15] | Half | 32-bit | 1 … 12 | X | Universal | 33 |
| 06P3701 | Gigabit Ethernet SX Server Adapter (fiber) | Half | 64-bit | 1 … 12 | X | Universal | 66 |
| | **Token Ring** | | | | | | |
| 34L0701 | Token-Ring 16/4 PCI Adapter 2 with Wake on LAN[15] | Half | 32-bit | 1 … 12 | X | Universal | 33 |
| 34L5001 | 16/4 Token-Ring PCI Management Adapter[15] | Half | 32-bit | 1 … 12 | X | Universal | 33 |
| 34L5201 | High-Speed 100/16/4 Token-Ring PCI Management Adapter[15] | Half | 32-bit | 1 … 12 | X | Universal | 33 |
| | **Communications[16]** | | | | | | |
| 33L4618 | V.90 PCI Data/Fax Modem[17] | Half | 32-bit | 1 … 5, 10 … 12 | - | 5 | 33 |
| 37L14xx | Serial I/O SST 8, 16 and 128 Port Adapters[18] | Half | 32-bit | (1 … 5, 10 … 12)[18] | - | 5 | 33 |
| | **Systems Management[19]** | | | | | | |
| 03K9309 | Netfinity advanced Systems Management Interconnect Cable Kit[20] | - | - | - | - | - | - |
| 36L9654 | Netfinity Advanced System Management Token-Ring Connection[21] | - | - | - | - | - | - |
| 02K6545 | UltraSlim 56W AC Adapter[22] | - | - | - | - | - | - |
| | **Host Attach** | | | | | | |
| 9086001 | Netfinity ESCON Adapter[23] | Full | 32-bit | (1 … 5, 10 … 12)[24] | - | 5 | 33 |

1. The P-6 I/O bus supports four independent 64-bit PCI buses, two of which drive eight 33MHz, 5V slots (1-5, 10-12), while the other two buses drive four 66MHz, 3.3V slots (6-9). The 5V slots support universal or 5V adapters. A 66MHz adapter plugged into these slots will operate at 33MHz. The 3.3V slots support universal or 3.3V adapters. A 33MHz adapter plugged into these slots limits a 66MHz PCI adapter installed on the same bus to 33MHz.
2. A 64-bit adapter installed into a 32-bit slot will transfer data at 32-bit rates. Adapters rated at 66MHz will operate at 33MHz when installed in a 33MHz slot. 33MHz adapters will reduce 66MHz buses to 33MHz.
3. All 12 slots are hot-plug capable using IBM's Active PCI technology. For Network Operating System support, access www.pc.ibm.com/us/compat.
4. xSeries 370 includes a dual-port, dual-channel, 64-bit Wide Ultra2 SCSI controller which supports either Single Ended (SE) or Low Voltage Differential SCSI (LVDS) modes. One internal connector and one external port with a 0.8mm Very High Density Connection Interface (VHDCI) are standard. The internal LVD SCSI cable has sufficient length to attach to an adapter located in slots 10 … 12. If a boot device (internal or external) is to be attached to an adapter, the adapter must reside in slots 10 … 12 due to BIOS scanning sequences.
5. ServeRAID-4L Ultra160 SCSI Controller is powered by a 100MHz Intel i960 processor and provides a single channel, 16MB of ECC cache and either one internal or one external Ultra160 connection. External connector is 0.8mm VHDCI.
6. ServeRAID-4M Ultra160 SCSI Controller is powered by a 100MHz Intel i960 processor and provides two channels, 64MB of battery-backed ECC cache and two internal and two external Ultra160 connectors (only two connectors may be utilized). External connectors are 0.8mm VHDCI.
7. ServeRAID-4H Ultra160 SCSI Controller is powered by a 266MHz PowerPC 750 processor and provides 128MB of battery-backed ECC cache with two internal and up to four external Ultra160 connectors (only four connectors may be utilized). External connectors are 0.8mm VHDCI.
8. ServeRAID-4Mx Ultra160 SCSI Controller is powered by a 100MHz Intel Zion GC80303 processor that provides 64MB of battery-backed ECC cache and two internal and two external Ultra160 connections (only two connectors may be used). External connections are 0.8mm VHDCI.
9. ServeRAID-4Lx Ultra160 SCSI Controller is powered by a 100MHz Intel Zion GC80303 processor and provides a single channel, 32MB of ECC cache and either one internal or one external Ultra160 connection. External connectior is 0.8mm VHDCI
10. PCI Wide Ultra160 SCSI Adapter (P/N 19K4646) provides a single channel with one internal connector, a five-drop multi-mode terminated LVD SCSI cable and one external 0.8mm VHDCI connector. Only one of the two connectors may be utilized.
11. See Fibre Array Solutions section for additional configuration information.
12. The 2108R3L SAN Data Gateway Router Ultra SCSI LVD port provides one integrated short-wave optical port and two SCSI ports for tape storage connections (LVD, HVD and single-ended).
13. xSeries 370 does not include an onboard network controller..

14. In a fault-tolerant networking environment, using the fault-tolerant software delivered with the Ethernet adapters of a single manufacturer is recommended. Installing fault-tolerant solutions provided by multiple manufacturers may cause failures if the intermediate drivers provided with the adapters are not compatible. The two Intel-based optional Ethernet adapters (P/N 06P3601, 06P3601) provide compatible intermediate drivers for failover support.
15. The Wake on LAN function of this option is not supported by this server.
16. xSeries 370 includes two USB ports, two high-speed serial/asynchronous ports (NS 16550A compatible), and one high-speed (up to 2MBps data transfer speed) bidirectional parallel port supporting devices using ECP/EPP/SSP protocols adhering to the IEEE 1284 standard.
17. Due to homologation variances, modem availability may differ by country.
18. See Appendix E for details on Serial I/O options and configuration limitations. A maximum of four Serial I/O adapters (any combination of P/N 37L1414, 37L1415, 37L1416, 37L1423) may be installed.
19. xSeries 370 ships standard with a Netfinity Advanced System Management PCI Adapter.
20. Required for all xSeries and Netfinity servers containing a standard Advanced System Management Processor that are to be interconnected for system management support through a LAN or modem connection. Up to 12 service processors may be interconnected (including standard and optional processors) with an aggregate connection length of no more than 91.4m (300ft). A customer-supplied Ethernet cable is required for each interconnection.
21. Contains an IBM Turbo 16/4 Token-Ring PCI Card, which installs in the PCMCIA card slot of Netfinity Advanced System Management PCI Adapter and a PC Card to 9-pin D-Shell cable which is routed to a rear chassis cut-out. The Netfinity Advanced System Management PCI Adapter's integrated Ethernet port and Netfinity Advanced System Management Token-Ring Connection cannot be connected or used together. To download the latest firmware, access www.pc.ibm.com/ww/eserver/xseries, select Support and Downloads, the server brand, Hardware Drivers … (in the Fixes menu), server family, model, then Advanced Systems Management in the Downloadable Files menu.
22. Although the xSeries 370 integrated Netfinity System Management PCI Adapter is powered continuously through the redundant power supply subsystem, an even higher level of availability is offered with the addition of UltraSlim 56W AC Adapter by allowing an independent power source or connection to a separate optional UPS.
23. Provides an ESCON MIC and DB9 Serial Port. Cables are not included but are available through S/390 channels. Contact your IBM representative for additional information.
24. A maximum of two 9086001 adapters (installed in nonadjacent slots) are supported in a single server. Where possible, install in a minimally loaded bus.
25. PCI Fast/Wide Ultra SCSI Adapter (P/N 02K3454) provides one external 68-pin high density connector that supports external SCSI devices such as tape enclosures.


Full Length, 64-bit, Hot-Plug PCI Slots
Slot 1- Bus D- 33MHz- 5V or Universal
Slot 2- Bus D- 33MHz- 5V or Universal
Slot 3- Bus D- 33MHz- 5V or Universal
Slot 4- Bus D- 33MHz- 5V or Universal
Slot 5- Bus D- 33MHz- 5V or Universal
Slot 6- Bus C- 66MHz- 3.3V or Universal
Slot 7- Bus C- 66MHz- 3.3V or Universal
Slot 8- Bus B- 66MHz- 3.3V or Universal
Slot 9- Bus B- 66MHz- 3.3V or Universal
Slot 10- Bus A- 33MHz- 5V or Universal
Slot 11- Bus A- 33MHz- 5V or Universal
Slot 12- Bus A- 33MHz- 5V or Universal



## xSeries 370 Power, Monitors & Accessories

| Part Number | Description |
|---|---|
| | **Power[1]** |
| | **Uninterruptible Power Supply (UPS)[2]** |
| 94G6676 | APC Smart-UPS 3000RMB[3] |
| 37L6861 | APC Smart-UPS 5000RMB[4] |
| | **Monitors[5]** |
| 633347N | E51 Color Monitor 15in (350mm, 13.8in Viewable Image Size), stealth black[6] |
| 6331N2N | E54 Color Monitor 15in (350mm, 13.8in Viewable Image Size), stealth black[6] |
| 6332J1N | E74 Color Monitor 17in (403mm, 15.9in Viewable Image Size), stealth black[6] |
| 66274AN | G78 Color Monitor 17in (406.4mm, 16in Viewable Image Size), stealth black[6] |
| 9511AG4 | T540 Flat Panel Color Monitor 15in (381mm, 15in viewable image), stealth black[7] |

1.xSeries 370 systems contain three 750W (at 220V), hot-swap power supplies which handle robust configurations while providing full redundancy. When operating at 110V, redundancy is limited to configurations not exceeding six processors, 24 memory RDIMMs, or eight PCI adapters. Each system ships with nine power cords: 3 x 220V, 3 x 110V, 3 x intra-rack 220V. Even though multiple UPSs may provide redundant power sources, systems management software does not currently take advantage of its power outage alerts.
2. For runtimes and UPS attributes see Appendix C: UPS Runtime Estimates.
3. Height is 3U. See Rack Cabinets and Options section for supported IBM racks.
4. Height is 5U. See Rack Cabinets and Options section for supported IBM racks.
5. xSeries 370 uses an SVGA controller (S3 Trio 3D chipset) with 4MB of video memory.
6. Installation within a rack requires optional Monitor Compartment (P/N 94G7444).
7. Installation within a rack requires optional Netfinity Flat Panel Monitor Rack Mount Kit II (P/N 37L6888) and Netfinity Rack Keyboard Tray (P/N 28L4707). A space saver keyboard may coexist within the same 28L4707 keyboard tray.

| Part Number | Description |
|---|---|
| **Conversion Kits** | |
| 28L4705 | 8Ux28D Rack-to-Tower Kit[1] |
| **Rack and NetBAY[2]** | |
| | Refer to the Rack Cabinets and Options section for information concerning IBM racks and rack-supported devices. |
| **Keyboard and Mouse[3]** | |
| 28L3644 | Space Saver II Keyboard[4, 5] |
| 01K1260 | TrackPoint IV 104-Key Black Keyboard[5, 6] |
| 28L3621 | Preferred Keyboard (stealth black)[6] |
| 28L3673 | Sleek 2-Button Stealth Black Mouse |

1. Includes one Netfinity NetBAY3E with casters.
2. xSeries 370 is housed in a 19in rack-mountable drawer and requires one of the racks listed in the Rack Cabinets and Options section.
3. xSeries 370 ships without a keyboard or mouse.
4. Installation within a rack requires optional keyboard tray (P/N 28L4707), which stows in ready-to-use position.
5. Advanced TrackPoint IV features are not available on IBM xSeries or Netfinity sy.stems.
6. Installation within a rack requires optional keyboard tray P/N 28L4707. This keyboard cannot share a keyboard tray with a flat panel display.

## xSeries 370 Tape Options

| Part Number | Tape Drives | Bays Supported | SCSI Interface (bit) | Form Factor | Termination Included | 68/50-pin Converter Incl | Ext Tape Enclosures |
|---|---|---|---|---|---|---|---|
| 00N7991 | 20/40GB DDS/4 4mm Internal Tape Drive | - | 16 Ultra2 LVD | 89mm (3.5in) HH or 133mm (5.25in) HH | N | - | 3510020[2], 3551001[1] |
| 09N4040 | 20/40GB DLT Internal SCSI Tape Drive | - | 8 | 133mm (5.25in) FH | N | Y | 3503B0X[2], 3551001 |
| 00N7990 | 40/80GB DLT Internal SCSI Tape Drive | - | 16 Ultra2 LVD | 133mm (5.25in) FH | N | - | 3503B0X[2], 3551001[1] |
| 00N8017 | 60/120GB 8mm M2 SCSI Tape Drive | - | 16 Ultra2 LVD | 133mm (5.25in) HH | N | - | 3510020[2], 3551001[1] |
| 00N8016 | 100/200GB LTO Tape Drive | - | 16 Ultra2 LVD | 133mm (5.25in) FH | N | - | 3551001[1] |
| 24P2396 | 100/200GB LTO Half-High Tape Drive | - | 16 Ultra2 LVD | 133mm (5.25in) HH | N | - | 3551001[1] |
| **Tape Autoloaders** | | | | | | | |
| 3502108 | DLT Tape Autoloader | - | 16 | Desktop | Y | - | - |
| 00N7992 | 120/240GB DDS/4 Tape Autoloader | - | 16 Ultra2 LVD | 133mm (5.25in) FH | N | - | 3551001[1] |
| 3600109 | 3600 Series 900GB/1.8TB LTO Tape Autoloader[3] | - | 16 Ultra2 LVD | Tower or 6U Rack | Y | - | - |
| **External Tape Libraries[4]** | | | | | | | |
| 3502x14 | DLT Tape Library | - | 16 | Desktop or Rack | Y | - | - |
| 3570C2x | Magstar MP 3570 Tape Subsystem | | HVD | 6U Rack | Y | - | - |
| 3600220 | 3600 Series 2/4TB LTO Tape Library (Tower) | - | 16 Ultra2 LVD | Tower | Y | - | - |
| 3600R20 | 3600 Series 2/4TB LTO Tape Library (Rack) | - | 16 Ultra2 LVD | 5U Rack | Y | - | - |
| 3600LXU | 3600 Series 2-Drive, 20-Cartridge Expander Module[5] | - | 16 Ultra2 LVD | 5U Rack | Y | - | - |
| 09N4048 | 3600 Series LTO Drive Upgrade Option[6] | - | 16 Ultra2 LVD | - | N | - | - |
| **External Tape Enclosures** | | | | | | | |
| 3510020 | External Half High SCSI Storage Enclosure[7] | - | 8, 16 | Desktop | N | N | - |
| 3503B0X | DLT External SCSI Enclosure[8] | | 16 | Desktop | N | N | - |
| 3551001 | NetMEDIA Storage Expansion Unit EL[9] | - | 16 | Rack | Y | N | - |
| 10L7113 | NetMEDIA Systems Management Adapter[10] | - | 16 LVD | - | N | N | 3551001 |
| **Associated Options** | | | | | | | |
| 00N7956 | 68-pin External Multimode LVD/SE SCSI Terminator | - | 16 LVD/SE | Ext | Y | N | 3510020, 3503B0X |
| 10K2340 | Media BayTray and LVD Cable Kit[1] | - | 16 LVD | Int | Y | N | 3551001 |

Note: xSeries 370 does not support internal tape drives but does include an external Ultra2 0.8mm VHDCI SCSI connector for attachment of an external tape or tape enclosure. All tape drives and enclosures are also supported by PCI Wide Ultra160 SCSI Adapter (P/N 19K4646) which has an external 0.8mm VHDCI connector. Select tape drive, enclosure and controller then use Appendix D: Cables - Storage Units - Controllers to select an appropriate external cable

1. LVD support for LVD devices installed in a NetMEDIA Storage Expansion Unit EL (P/N 3551001) requires replacement of the standard single-ended internal cables with one or more (depending on configuration) cables from Media Bay Tray and LVD Cable Kit (P/N 10K2340) which contains a single two-drop multi-mode terminated cable. If the standard cables are used for attachment to LVD devices, single-ended SCSI rules and bus speeds apply.
2. Requires 68-pin External Multimode LVD/SE SCSI terminator (P/N 00N7956).
3. If installed in a rack, a fixed shelf is required. Allow an additional 1U for the fixed shelf. One unit only per shelf is supported.
4. Tape library attributes and prerequisites are located in Appendix B: Tape Library Attributes.
5. Supported only with the 3600 Series LTO Tape Library (rack) (P/N3600R20). Allow one additional EIA space when installing either one or two (maximum) units to accommodate a filler plate for cable routing. Up to two 3600 Series LTO Drive Upgrade Options can be installed in each module or the module can operate off the LTO drives installed in the LTO tape library.
6. Install in second drive bay of 3600 Series LTO Tape Libraries or in either of the two bays of 3600 Series 2-drive, 20-cartridge Expander Module to increase performance. Includes an LTO (Ultrium) drive and a one-meter external LVD SCSI cable.
7. Provides a black desktop 133mm (5.25in) half-high (HH) tape enclosure. Connector is configurable as 50-pin Centronix or 68-pin high density. Requires either tape drive self termination or 68-pin External Multimode LVD/SE SCSI Terminator (P/N 00N7956).
8. Provides a black desktop DLT tape enclosure with a 68-pin high density external connector. Requires termination by the tape drive or by installation of an External Multimode LVD/SE SCSI terminator (P/N 00N7956).
9. NetMEDIA Storage Expansion Unit EL (P/N 3551001) is a black 3U, 19in rack or NetBAY3/3E mountable tape enclosure which includes two full-high (FH) or four half-high (HH) extended length 133mm (5.25in) bays, two external 68-pin high density connectors and two internal four-drop single-ended terminated 16-bit SCSI cables for device attachment. Two power supplies and two power cords are also included. Tip: The front rail clips will need to be reversed and screwed in from behind to secure the unit in a 930842x rack.
10. NetMEDIA Systems Management Adapter (P/N 10L7113) may be installed in a 3551001 to provide repeater function, LVDS interface, aggregate cable lengths up to 12m when attached to an LVD SCSI controller, and auto-termination when the 3551001 is powered off. External connector is 0.8mm VHDCI.

Note: Additional tape attributes can be found in Appendix A: Tape Drive Attributes.

## xSeries 370 Sample Configurations

The following sample configurations are for illustration only and may not be suitable for any specific customer installation. Contact your IBM Business Partner or IBM Marketing Representative for assistance with your specific configuration requirements.

### High Availability - Rack

| Part Number | Description | Quantity | Usage |
|---|---|---|---|
| 8681-2RX | xSeries 370 700MHz/2MB, 512MB ECC, Open, 48X, PCI (Rack 8U) | 1 | Power Redundancy standard |
| 10K2166 | Netfinity 8500R 700MHz/2MB Upgrade with Pentium III Xeon Processor | 5 | Total of 6 SMP processors |
| 10K2335 | Netfinity 4X Accelerator Filter | 1 | Required for greater than 4 processors |
| 10K2337 | Netfinity Mezzanine Expansion Kit | 1 | Required for greater than 4 processors |
| 20L0247 | Netfinity 256MB SDRAM ECC RDIMM II | 8 | Total of over 2GB of memory |
| 28L4454 | Netfinity 8500R Memory Expansion Card | 1 | Enables cache line interleaving |
| 37L7201 | 9.1GB Ultra160 SCSI Hot-Swap SL HDD | 2 | NOS mirroring |
| 37L6889 | ServeRAID-4H Ultra160 SCSI Controller | 1 | RAID Controller - NOS plus EXP300 |
| 06P3601 | 10/100 Ethernet Server Adapter | 1 | - |
| 6331N2N | E54 Color Monitor 15in (350mm, 13.8in Viewable Image Size), stealth black | 1 | - |
| 28L3644 | Space Saver II Keyboard | 1 | - |
| 37L6861 | APC Smart-UPS 5000RMB (5U) | 1 | - |
| | **External Storage** | | |
| 3551001 | NetMEDIA Storage Expansion Unit EL | 1 | External Tape Drive Enclosure |
| 00N7990 | 40/80GB DLT Internal SCSI Tape Drive | 2 | Installs in 3551001 |
| 10K2340 | Media Bay Tray and LVD Cable Kit | 1 | - |
| 03K9310 | 2M External Ultra2 SCSI Cable | 1 | 3551001 to onboard SCSI |
| 35311RU | EXP300 Storage Expansion Unit | 1 | Provides additional 14 bays |
| 37L7204 | 9.1GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD | 6 | RAID 5 with Hot-Spare in EXP300 |
| | **Rack Options** | | |
| 9306200 | Netfinity NetBAY22 | 1 | Monitor and keyboard mount on top |
| 36L9702 | NetBAY22 Rack Extension Kit | 1 | Required for rear door closure |
| 94G6667 | Power Cable - Type A14 (4) | 2 | - |
| 94G6670 | Blank Filler Panel Kit | 1 | - |

This high availability server is configured to act as the foundation for business critical applications, applications your business cannot afford to be without. The configuration includes enough disk drives to mirror the operating system and provide a RAID 5 data environment, power supply redundancy by the server and EXP300 and a UPS for power even during a blackout. A rack mounted tape drive is included to back up that all important asset--data. This server represents the leading edge in high availability.

## Notes/Exchange - Stack

| Part Number | Description | Quantity | Usage |
|---|---|---|---|
| 8681-1RX | xSeries 370 700MHz/1MB, 512MB ECC, OPEN, 48X, PCI (Rack 8U) | 1 | Power redundancy standard |
| 10K2330 | Netfinity 8500R 700MHz/1MB Upgrade with Pentium III Xeon Processor | 5 | Total of 6 SMP processors |
| 10K2335 | Netfinity 4X Accelerator Filter | 1 | Required for greater than 4 processors |
| 10K2337 | Netfinity Mezzanine Expansion Kit | 1 | Required for greater than 4 processors |
| 20L0249 | Netfinity 512MB SDRAM ECC RDIMM II | 3 | Total of 2GB of memory |
| 28L4454 | Netfinity 8500R Memory Expansion Card | 1 | Enables cache line interleaving |
| 37L7201 | 9.1GB Ultra160 SCSI Hot-Swap SL HDD | 2 | NOS Mirroring |
| 06P3601 | 10/100 Ethernet Server Adapter | 2 | - |
| 37L6889 | ServeRAID-4H Ultra160 SCSI Controller | 1 | RAID Controller-NOS plus EXP300 |
| 6331N2N | E54 Color Monitor 15in (350mm, 13.8in Viewable Image Size), stealth black | 1 | - |
| 28L3644 | Space Saver II Keyboard | 1 | - |
| 37L6861 | APC Smart-UPS 5000RMB (5U) | 1 | - |
| **External Storage** | | | |
| 3551001 | NetMEDIA Storage Expansion Unit EL | 1 | External Tape Enclosure - Install in NetBAY3E |
| 00N7990 | 40/80GB DLT Internal SCSI Tape Drive | 2 | Installs in 3551001 |
| 10K2340 | Media Bay Tray and LVD Cable Kit | 1 | - |
| 03K9310 | 2M External Ultra2 SCSI Cable | 1 | 3551001 to Onboard SCSI |
| 35311RU | EXP300 Storage Expansion Unit | 1 | Provides additional 14 Bays, 1 x 2M cable |
| 37L7205 | 18.2GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD | 14 | RAID 5 with Hot-Spare in EXP300 |
| **Stack Options** | | | |
| 28L4705 | Netfinity 8Ux28D Rack-to-Tower Kit | 1 | - |
| 36L9701 | Netfinity NetBAY3E | 3 | 3 x 3U enclosure for UPS, EXP300, Tape |

**Refer to the IBM Datacenter Solutions section for xSeries 370 cluster solutions configured with Fibre Channel storage components and connections. Datacenter solutions are also certified for Windows 2000 and Windows NT 4.0 operating systems.**

# IBM External Storage Expansion Unit Overview

| Part Number | Subsystem Type | Total Bays | Hot-Swap Bays (total/avail) | Maximum Storage Capacity (GB) | Dimensions (W x D x H) | Form Factor | Max Cfg Wt | Power Supply |
|---|---|---|---|---|---|---|---|---|
| **IBM External Storage Expansion At-A-Glance** | | | | | | | | |
| 35421RU FAStT200 | Fibre Channel | 10 | 10/10 | 364 | 480mm x 575mm x 131.8mm (18.9in x 22.63in x 5.2in) | Rack Drawer (3U) | 42.3kg (94lbs) | Redundant 350W |
| 35422RU1 FAStT200 HA[1] | Fibre Channel | 10 | 10/10 | 364 | 480mm x 575mm x 131.8mm (18.9in x 22.63in x 5.2in) | Rack Drawer (3U) | 42.3kg (94lbs) | Redundant 350W |
| 35311RU EXP300 | Ultra160 LVDS | 14 | 14/14[2] | 509.6 | 444mm x 519mm x 127.5mm (17.5in x 20.4in x 5in) | Rack Drawer (3U)[3] | 34.5kg (76.1lbs) | Redundant 500W |
| 35601RU FAStT EXP500 | Fibre Channel[4] | 10 | 10/10 | 364 | 447mm x 56mm x 128mm (17.6in x 22.2in x 5in) | Rack Drawer (3U) | 36.1kg (79.6lbs) | Redundant 350W |

To attach a Storage Enclosure to an IBM xSeries or Netfinity server, the following is required:
* Attachment to an appropriate SCSI controller.
* External Cable(s) - See Appendix D: Cables - Storage Units - Controllers.

1. Identical to FAStT200 (P/N 35421RU) with the addition of a second FAStT200 Failsafe RAID Controller.
2. Supports the use of slim-line drives only.
3. A rack-to-tower conversion kit option is available.
4. Attachment to a FAStT500 Storage Server (P/N 35521RU) is required for this device to function. See FAStT EXP500 Configurator section for more information.

# FAStT200 Storage Server (3542xRU)

## FAStT200 (HA) Storage Expansion Unit

| Total Internal Storage[1] | 10,000RPM HDDs | | | 15,000RPM HDDs |
|---|---|---|---|---|
| | 18.2GB[2] (19K0652) | 36.4GB (19K0653) | 73.4GB (19K0654) | 18.2GB (06P5707) |
| 0GB | Standard on base models | | | |
| 18.2GB | 1 | - | - | 1 |
| 36.4GB | 2 | 1 | - | 2 |
| 54.6GB | 3 | - | - | 3 |
| 72.8GB | 4 | 2 | - | 4 |
| 73.4GB | - | - | 1 | - |
| 91.0GB | 5 | - | - | 5 |
| 109.2GB | 6 | 3 | - | 6 |
| 145.6GB | 8 | 4 | - | 8 |
| 146.8GB | - | - | 2 | - |
| 182.0GB | 10 | 5 | - | 10 |
| 218.4GB | - | 6 | - | - |
| 220.2GB | - | - | 3 | - |
| 254.8GB | - | 7 | - | - |
| 291.2GB | - | 8 | - | - |
| 293.6GB | - | - | 4 | - |
| 327.6GB | - | 9 | - | - |
| 364.0GB | - | 10 | - | - |
| 367.0GB | - | - | 5 | - |
| 440.4GB | - | - | 6 | - |
| 513.8GB | - | - | 7 | - |
| 587.2GB | - | - | 8 | - |
| 660.6GB | - | - | 9 | - |
| 734.0GB (max) | - | - | 10 | - |

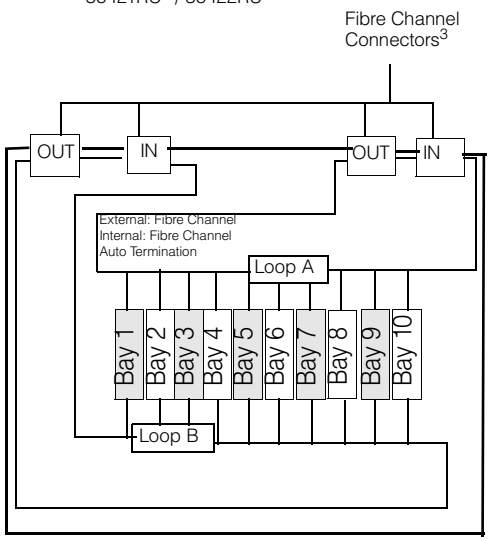
This table does not represent all valid HDD configurations.
1. Select a total storage row and then select the quantity of HDDs from a column corresponding to the HDD of choice. Total Internal Storage listed is within +/- 0.2GB unless otherwise noted.
2. When referring to hard disk drive capacity, GB equals one billion bytes. Total user accessible capacity may vary depending on operating environments.

| Part Number | Description | RPM | Height | Bays Supported | Max Qty Supported |
|---|---|---|---|---|---|
| 19K0652 | Netfinity 18.2GB 10K-4 FC Hot-Swap HDD | 10,000 | SL | 1 … 10 | 10 |
| 19K0653 | Netfinity 36.4GB 10K-4 FC Hot-Swap HDD | 10,000 | SL | 1 … 10 | 10 |
| 19K0654 | Netfinity 73.4GB 10K-4 FC Hot-Swap HDD | 10,000 | HH | 1 … 10 | 10 |
| 06P5707 | Netfinity 18.2GB 15K-rpm FC Hot-Swap HDD | 15,000 | SL | 1 … 10 | 10 |

| External Storage Expansion Units | | Form Factor |
|---|---|---|
| 35421RU | FAStT200 Storage Server[1, 2] | Rack (3U) |
| 35422RU | FAStT200 HA Storage Server[1] | Rack (3U) |
| 19K1121 | FAStT200 Redundant RAID Controller | - |

1. The FAStT200 includes two hot-swap, 350W auto-ranging redundant power supplies, each with its own power cord.
2. Can be upgraded to FAStT200 HA Storage Server through the addition of a FAStT200 Redundant RAID Controller (P/N 19K1121).

**FAStT200 Storage Server[1]**
35421RU[2] / 35422RU




**IN = connection to host**
**OUT = connection to expansion units**

1. Housed in a 19in rack-mountable drawer and ships standard with redundant power supplies and two power cables requiring separate power sources.
Requires an IBM industry standard 19in rack, EIA-310D with a minimum depth of 24in (711.2mm ) or NetBAY3/3E.
Select optional storage controllers and external cables, which are not included with the FAStT storage server or external enclosure, using the Fibre Channel Device Ports Reference.
2. 35421RU includes a single loop only. The second loop is created with the addition of FAStT200 Redundant RAID Controller (P/N 19K1121).
3. GBICs are not included. Either Fibre Channel long-wave GBICs (P/N 03K9307) or short-wave (P/N 03K9308) GBICs may be used.

# IBM EXP300 (35311RU)

## EXP300 Hard Disk Drive (HDD) Storage

| Total Int. Storage[1] | 7,200RPM HDDs | | | 10,000RPM HDDs | | | | 15,000RPM HDDs | |
|---|---|---|---|---|---|---|---|---|---|
| | 9.1GB (37L7201) | 18.2GB (37L7202) | 36.4GB (37L7203) | 9.1GB (37L7204) | 18.2GB (37L7205) | 36.4GB (37L7206) | 73.4GB (06P5756) | 9.1GB (19K0655) | 18.2GB (19K0656) |
| 0GB | Standard on base models | | | | | | | | |
| 18.2GB | 2 | 1 | - | 2 | 1 | - | | 2 | 1 |
| 36.4GB | 4 | 2 | 1 | 4 | 2 | 1 | | 4 | 2 |
| 54.6GB | 6 | 3 | - | 6 | 3 | - | | 6 | 3 |
| 72.8GB | 8 | 4 | 2 | 8 | 4 | 2 | | 8 | 4 |
| 91GB | 10 | 5 | - | 10 | 5 | - | | 10 | 5 |
| 109.2GB | 12 | 6 | 3 | 12 | 6 | 3 | | 12 | 6 |
| 127.4GB | 14 | 7 | - | 14 | 7 | - | | 14 | 7 |
| 145.6GB | - | 8 | 4 | - | 8 | 4 | | - | 8 |
| 182GB | - | 10 | 5 | - | 10 | 5 | | - | 10 |
| 218.4GB | - | 12 | 6 | - | 12 | 6 | | - | 12 |
| 254.8GB | - | 14 | 7 | - | 14 | 7 | | - | 14 |
| 291.2GB | - | - | 8 | - | - | 8 | | - | - |
| 364.0GB | - | - | 10 | - | - | 10 | | - | - |
| 436.8GB | - | - | 12 | - | - | 12 | | - | - |
| 509.6GB | - | - | 14 | - | - | 14 | | - | - |
| 587.2GB | - | - | - | - | - | - | 8 | - | - |
| 734GB | - | - | - | - | - | - | 10 | - | - |
| 880.8GB | - | - | - | - | - | - | 12 | - | - |
| 1027.6GB (max) | - | - | - | - | - | - | 14 | - | - |

This table does not represent all possible HDD configurations.
1. Select a total storage row then select the quantity of HDDs from a column corresponding to the HDD of choice. Total Internal Storage listed is within +/- 0.2GB unless otherwise noted.

| SCSI ID | Form Factor | Height | Front Access | Usage |
|---|---|---|---|---|
| 0 … 6 | HS | SL | Yes | open |
| 8 … 14 | HS | SL | Yes | open |

| Maximum MB/s | |
|---|---|
| Cable Length (Meters)[1] | Ultra160 Controller |
| 2 | 160 |
| 4.2 | 160 |

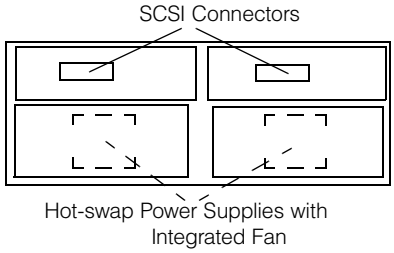
1. The EXP300 ships with a single Ultra2 SCSI cable similar to Netfinity 2M Ultra2 SCSI Cable (P/N 03K9310).

| Part Number | Description | RPM | Height | Bays Supported[1] | Max Qty |
|---|---|---|---|---|---|
| | **Ultra 160 HDDs[2]** | | | | |
| 37L7201 | 9.1GB Wide Ultra2 SCSI Hot-Swap SL HDD | 7200 | SL | 1 … 14 | 14[3] |
| 37L7202 | 18.2GB Ultra160 SCSI Hot-Swap SL HDD | 7200 | SL | 1 … 14 | 14[3] |
| 37L7203 | 36.4GB Ultra160 SCSI Hot-Swap SL HDD | 7200 | SL | 1 … 14 | 14[3] |
| 37L7204 | 9.1GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD | 10000 | SL | 1 … 14 | 14[3] |
| 37L7205 | 18.2GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD | 10000 | SL | 1 … 14 | 14[3] |
| 37L7206 | 36.4GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD | 10000 | SL | 1 … 14 | 14[3] |
| 19K0655 | 9.1GB 15Krpm Ultra160 SCSI Hot-Swap HDD | 15000 | SL | 1 … 14 | 14[3] |
| 19K0656 | 18.2GB 15Krpm Ultra160 SCSI Hot-Swap HDD | 15000 | SL | 1 … 14 | 14[3] |
| 06P5756 | 73.4GB 10Krpm Ultra160 SCSI Hot-Swap SL HDD | 10000 | SL | 1 … 14 | 14[3] |
| | **External Storage Expansion Units** | **Form Factor** | | | |
| 35311RU | EXP300 Storage Expansion Unit[4] | Rack (3U) | | | |

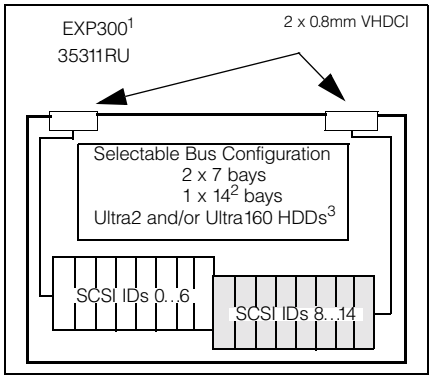
| | | |
|---|---|---|
| 09N7296 | EXP300 Rack-to-Tower Conversion Kit | - |

1. EXP300 Storage Expansion Unit ships with 14 slim-line hot-swap bays which can be configured as a single bus, two independent buses or a twintailed single bus.
2. When combined with a ServeRAID-4x controller, Ultra2 and Ultra160 HDDs may be mixed on the same bus and operate at up to their maximum respective speeds.
3.Twintailing reduces the maximum number of HDDs on a single bus to 13.
4. EXP300 includes a single 2M Ultra2 SCSI cable and dual hot-swap 500W redundant power supplies, each with its own power cord.

## EXP300 Storage Expansion Unit 35311RU




- Fourteen slim-high drive bays.
- Supports Ultra160 SCSI data transfer speeds - up to 160MB/s.
- Single or dual SCSI bus configurations.
- Dual hot-swap 500W redundant power supplies with integrated fan assemblies.
- Height is 3U (1U=1.75in or 44.45mm).
- Tower capability through optional Rack-to-Tower Conversion Kit.
- Requires Netfinity Enterprise Rack or Expansion Cabinet, IBM NetBAY Enterprise Rack or Expansion Cabinet, Netfinity Rack, Netfinity NetBAY22 or 19in EIA-D Industry-Standard Rack. Mounting rails are included with the unit.

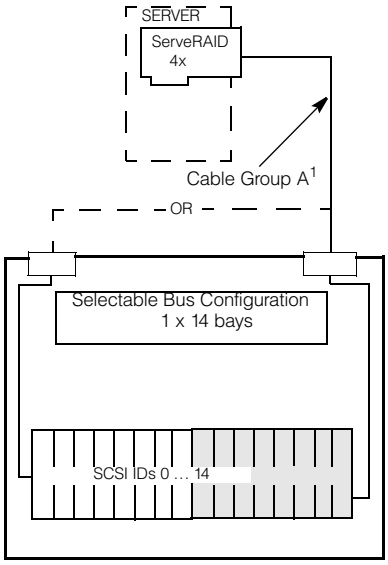



1. Housed in a 19in rack mountable drawer and ships standard with redundant 500W hot-swap power supplies, two power cords and a single 2M Ultra2 SCSI cable capable of supporting Ultra160 speeds.
2. Twintailing reduces the maximum number of HDDs on a single bus to 13.
3. When combined with a ServeRAID-4x controller, Ultra2 and Ultra160 HDDs may be mixed on the same bus and operate at up to their maximum respective speeds.

External Storage Expansion Units require storage controllers and external cables. Select a supported controller from the system configurator and cables from Appendix D: Cables - Storage Units - Controllers.

**Cables and Controllers:**
**See Appendix D: Cables - Storage Units - Controllers**

### EXP300 One Independent SCSI Bus

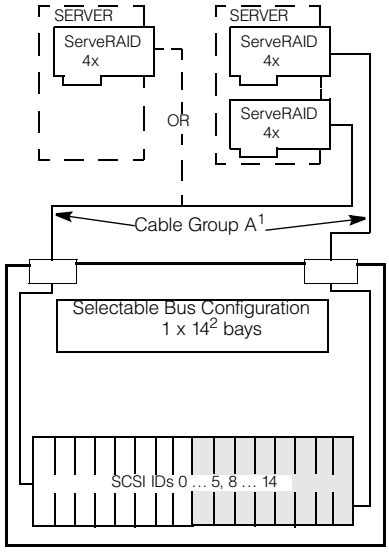



Order:
- 1 x 35311RU
- 1 x External Cable from Group A[1]
- Up to 14 Ultra2 and/or Ultra160 HDDs
-

1. One 2M Ultra2 cable is included with each EXP300. If a longer cable is desired, select one from cable group A.

### EXP300 One Independent Twintail SCSI Bus High Availability Configuration

To configure as one independent twintailed 13-bay SCSI bus, attach two external cables from two ServeRAID adapters, in the same or separate servers, to the two external ports of the EXP300. The EXP300 must be set for 1 x 14[2] bays.

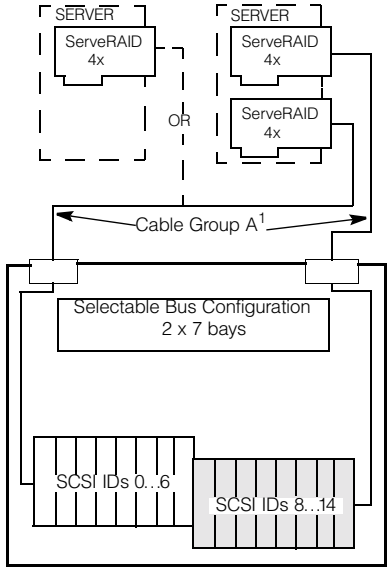



Order:
- 1 x 35311RU
- 2 x External Cables from Group A[1]
- Up to 13 Ultra2 and/or Ultra160 HDDs

1. One 2M Ultra2 cable is included with each EXP300. If a longer cable is desired, select one from cable group A.
2. Twintailing reduces the maximum number of HDDs on a single bus to 13.

### EXP300 Two Independent SCSI Buses

To configure as two independent seven-bay SCSI buses, attach two external cables from two ServeRAID adapters, in the same or separate servers, to the two external ports of the EXP300. The EXP300 must be set for 2 x 7 bays.




Order:
- 1 x 35311RU
- 2 x External Cables from Group A[1]
- Up to 14 Ultra2 and/or Ultra160 HDDs

1. One 2M Ultra2 cable is included with each EXP300. If a longer cable is desired, select one from cable group A.

# IBM FAStT EXP500 (35601RU)

## FAStT EXP500 Storage Expansion Unit

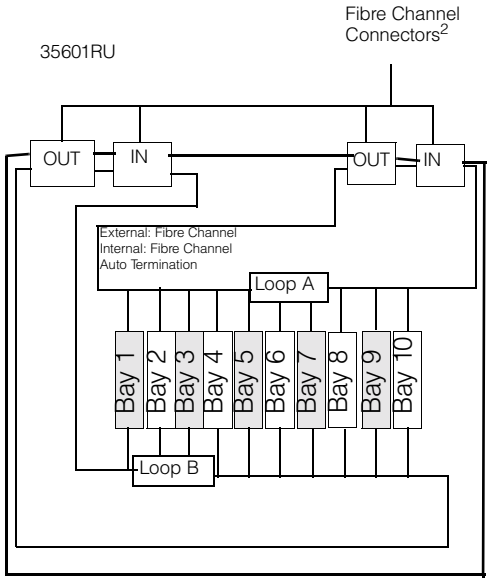
| Total Internal Storage[1] | 10,000RPM HDDs | | | 15,000RPM HDDs |
|---|---|---|---|---|
| | 18.2GB (19K0652) | 36.4GB (19K0653) | 73.4GB (19K0654) | 18.2GB (06P5707) |
| 0GB | Standard on base models | | | |
| 18.2GB | 1 | - | - | 1 |
| 36.4GB | 2 | 1 | - | 2 |
| 54.6GB | 3 | - | - | 3 |
| 72.8GB | 4 | 2 | - | 4 |
| 73.4GB | - | - | 1 | - |
| 91.0GB | 5 | - | - | 5 |
| 109.2GB | 6 | 3 | - | 6 |
| 145.6GB | 8 | 4 | - | 8 |
| 146.8GB | - | - | 2 | - |
| 182.0GB | 10 | 5 | - | 10 |
| 218.4GB | - | 6 | - | - |
| 220.2GB | - | - | 3 | - |
| 254.8GB | - | 7 | - | - |
| 291.2GB | - | 8 | - | - |
| 293.6GB | - | - | 4 | - |
| 327.6GB | - | 9 | - | - |
| 364.0 B | - | 10 | - | - |
| 367.0GB | - | - | 5 | - |
| 440.4GB | - | - | 6 | - |
| 513.8GB | - | - | 7 | - |
| 587.2GB | - | - | 8 | - |
| 660.6GB | - | - | 9 | - |
| 734.0GB (max) | - | - | 10 | - |

This table does not represent all valid HDD configurations.
1. Select a total storage row and then select the quantity of HDDs from a column corresponding to the HDD of choice. Total Internal Storage listed is within +/- 0.2GB unless otherwise noted.

| Part Number | Description | RPM | Height | Bays Supported | Max Qty Supported |
|---|---|---|---|---|---|
| 19K0652 | Netfinity 18.2GB 10K-4 FC Hot-Swap HDD | 10,000 | SL | 1 … 10 | 10 |
| 19K0653 | Netfinity 36.4GB 10K-4 FC Hot-Swap HDD | 10,000 | SL | 1 … 10 | 10 |
| 19K0654 | Netfinity 73.4GB 10K-4 FC Hot-Swap HDD | 10,000 | HH | 1 … 10 | 10 |
| 06P5707 | Netfinity 18.2GB 15K-rpm FC Hot-Swap HDD | 15,000 | SL | 1 … 10 | 10 |
| **External Storage Expansion Units** | | **Form Factor** | | | |
| 35601RU | FAStT EXP500 Storage Expansion Unit[1] | Rack (3U) | | | |

1. The FAStT EXP500 ncludes two hot-swap, 350W auto-ranging redundant power supplies, each with its own power cord.

**FAStT EXP500[1]**




**IN = primary or secondary (redundant) connection from FAStT500 Storage Server or previous FAStT EXP500 expansion unit daisy-chained from the storage server**
**OUT = primary or secondary (redundant) connection to additional FAStT EXP500 expansion units**

1. Housed in a 19in rack mountable drawer and ships standard with redundant power supplies and two power cables requiring separate power sources.
Requires an IBM industry standard 19in rack, EIA-310D with a minimum depth of 24in (711.2mm ) or NetBAY3/3E.
Select optional storage controllers and external cables, which are not included with the FAStT storage server or external enclosure, using the Fibre Channel Device Ports Reference.
2. GBICs are not included. Either Fibre Channel long or short-wave GBICs (P/N 03K9307 or 03K9308 respectively) may be used.

# Fibre Array Solutions

## Fibre Interconnection Guidelines

| Part Number | Description | 00N6881 FAStT Host Adapter | 00N6882 FAStT Mini Hub [1] | 19K1121 FastT200 Redun Raid Controller [1] | 2108R3L SAN Data Gateway Router | 2109S08 SAN FC Switch, 8-Port [1] | 2109S16 SAN FC Switch, 16-Port [1] | 35341RU SAN FC Managed Hub [1] | 35421RU FAStT200 Storage Server [1] | 35422RU FAStT200 HA Storage Server [1] | 35521RU FAStT500 Storage Server [1] | 35601RU FAStT EXP500 [1] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 00N6881 | FAStT Host Adapter | - | - | S | S | S | S | S | S | S | S | - |
| 00N6882 | FAStT500 Mini Hub | - | E | E | - | E | E | - | - | - | H | E |
| 19K1121 | FAStT200 Redundant RAID Controller | S | - | - | - | E | E | E | H | - | - | - |
| 2108R3L | SAN Data Gateway Router UltraSCSI LVD Port | S | - | - | - | S | S | S | - | - | - | - |
| 2109S08 | SAN FC Switch, 8-Port | S | E | E | S | E | E | - | E | E | E | E |
| 2109S16 | SAN FC Switch, 16-Port | S | E | E | S | E | E | - | E | E | E | E |
| 35341RU | SAN FC Managed Hub | S | E | E | S | - | - | E | E | E | E | - |
| 35421RU | FAStT200 Storage Server | S | - | H | - | E | E | E | - | - | - | E |
| 35422RU | FAStT200 HA Storage Server | S | - | - | - | E | E | E | - | - | - | E |
| 35521RU | FAStT500 Storage Server | - | H | - | - | E | E | E | - | - | - | E |
| 35601RU | FAStT EXP500 | - | E | E | - | - | - | - | E | E | E | E |
| 03K9307 | FC Long-Wave GBIC | - | H | H | - | H | H | H | H | H | H | H |
| 03K9308 | FC Short-Wave GBIC | - | H | H | - | H | H | H | H | H | H | H |

**S** Short-wave connection only. See Fibre Device Ports Reference section for GBIC/Integrated port information.
**E** Either short-wave or long-wave connections allowed via the appropriate GBIC. See Fibre Device Ports Reference section for GBIC/Integrated port information.
**H** Hardware connection: One of these devices installs directly into the other, i.e., the FAStT500 Mini Hub (P/N 00N6882) installs directly into the FAStT500 Storage Server (P/N 35521RU) to provide GBIC availability.

1. This device requires the use of GBICs. Purchase of GBICs may be needed in order to make connections to this device. See the Fibre Device Ports Reference section for GBIC/Integrated port information.

## Fibre Device Ports Reference

| Part Number | Description | Total Connections Possible | Integrated Ports[3] | Mini Hubs Possible | Mini Hubs Installed | GBIC Ports | GBICs Included[3] |
|---|---|---|---|---|---|---|---|
| 00N6881 | FAStT Host Adapter | 1 | 1 | - | - | - | - |
| 00N6882 | FAStT500 Mini Hub[1] | 2 | - | - | - | 2 | - |
| 03K9307 | FC Long-Wave GBIC | 1 | - | - | - | - | - |
| 03K9308 | FC Short-Wave GBIC | 1 | - | - | - | - | - |
| 19K1121 | FAStT200 Redundant RAID Controller | 2 | - | - | - | 2 | - |
| 2108R3L | San Data Gateway Router UltraSCSI LVD Port[2] | 1 | 1 | - | - | - | - |
| 2109S08 | SAN FC Switch, 8-Port | 8 | - | - | - | 8 | 4 |
| 2109S16 | SAN FC Switch, 16-Port | 16 | - | - | - | 16 | 4 |
| 35341RU | SAN FC Managed Hub | 8 | 7 | - | - | 1 | - |
| 35421RU | FAStT200 Storage Server | 2 | - | - | - | 2 | - |
| 35422RU | FAStT200 HA Storage Server | 4 | - | - | - | 4 | - |
| 35521RU | FAStT500 Storage Server | 16[4] | - | 8 | 4 | 16[1] | - |
| 35601RU | FAStT EXP500 | 4 | - | - | - | 4 | - |

1. Each FAStT500 Mini Hub provides two GBIC ports.
2. Provides one integrated short-wave optical port and two SCSI ports for tape storage connections (one LVD or HVD and one single-ended).
3. Standard GBICs and integrated optical ports support are short-wave.
4. FAStT500 Storage Server supports up to eight nonredundant or four redundant host connections and up to eight nonredundant or four redundant storage connections.

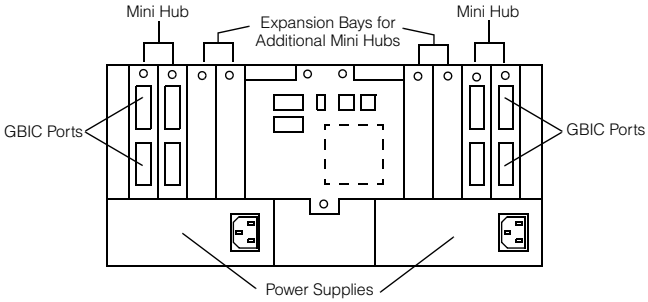
| Supported Cable Groups | |
|---|---|
| **Cable Group A (0.8mm to 0.8mm)** | |
| 03K9310 | Netfinity 2M Ultra2 SCSI Cable |
| 03K9311 | Netfinity 4.2M Ultra2 SCSI Cable |
| 37L7101 | Netfinity 20M Ultra2 SCSI Cable |
| **Cable Group D (Short-Wave Fibre)** | |
| 36L9973 | Netfinity Fibre Channel 1M Cable |
| 03K9306 | Netfinity Fibre Channel 5M Cable |
| 03K9305 | Netfinity Fibre Channel 25M Cable |
| Customer supplied short-wave cable of up to 500M (0.31 miles) | |
| **Cable Group E (Long-Wave Fibre)** | |
| Customer supplied long-wave cable of up to 10KM (6.2 miles) | |
| **GBIC** | |
| 03K9308 | Netfinity Fibre Channel Short-Wave GBIC[1] |
| 03K9307 | Netfinity Fibre Channel Long-Wave GBIC |

1. Four Netfinity Fibre Channel Short-Wave GBIC's (P/N 03K9308) are included with SAN Fibre Channel Switches (P/Ns 2109S08 and 2109S16).

## Netfinity FAStT Host Adapter 00N6881

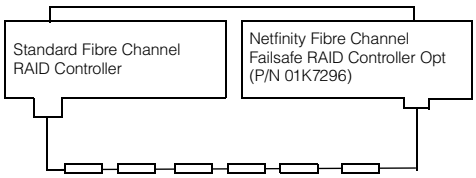
- PCI to FCAL 64/32-bit host adapter.
- Supported Attachments (use cable group D):
  FAStT500 Storage Server
- Integrated short-wave optical port. No GBICs required.
- Full Fibre Channel Fabric support.

## FAStT500 Storage Server 35521RU



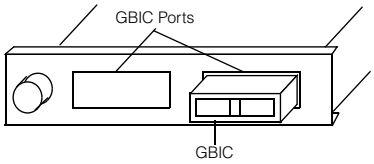

- Dual high-performance, RAID controller cards-supports up to 100MB/sec data transfer rate per controller.
- Two 175W auto-ranging, hot-swap, redundant power supplies.
- Attach directly to FAStT Host Adapter(s) (P/N 00N6881) with short-wave cables and GBICs or indirectly through SAN Fibre Channel Managed Hub (P/N 35341RU) using cables from cable group D or E with corresponding GBICs.
- Height is 4U (1U = 1.75in or 44.45mm)
- Requires Netfinity Enterprise Rack or Expansion Cabinet, Netfinity Rack, Netfinity NetBAY22 or 19-inch EIA-D Industry-Standard Rack. Mounting rails are included with the controller.
- For optimum performance no more than two FAStT500 Storage Servers (P/N 35521RU) should be attached to a single hub (P/N 35341RU)
- Includes four FAStT500 Mini Hubs (P/N 00N6882), two for host and two for storage.
- FAStT500 256MB Cache (P/N 00N6883) expansion is required in installations where a large number of devices are supported.
- All connections to FAStT500 Mini Hubs require the use of GBICs. GBICs not included.

## Netfinity Fibre Channel RAID Controller (35261RU)



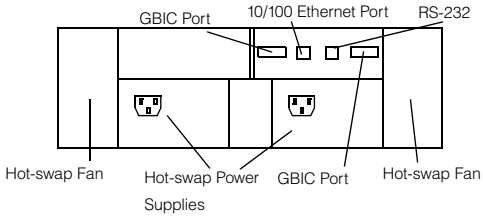

- Contains a single integrated short-wave optical port (use cable group D) and six female 0.8mm Very High Density Connection Interface (VHDCI) SCSI connectors.
- Hot-Swap Redundant Fans and Power Supplies.
- Optional Netfinity Fibre Channel Failsafe RAID Controller (P/N 01K7296) provides a redundant RAID controller and second Short-Wave Fibre Connection (use cable group D).
- Attach directly to FAStT Host Adapter(s) (P/N 00N6881) or indirectly through SAN Fibre Channel Managed Hub (P/N 35341RU) using cables from cable group D.
- Height is 4U (1U =1.75in or 44.45mm).
- Requires Netfinity Enterprise Rack or Expansion Cabinet, Netfinity Rack, Netfinity NetBAY22 or 19in EIA-D Industry-Standard Rack. Mounting rails are included with the controller.
- For optimum performance no more than two RAID controller units (P/N 35261RU) should be attached to a single hub.

## Netfinity FAStT500 Mini Hub 00N6882



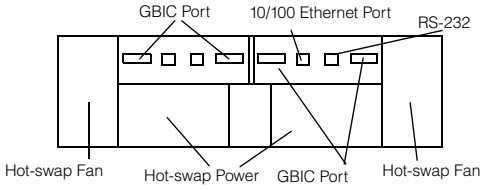

- Provides additional connections to the Netfinity FAStT500 Storage Server - supports complex clustering or advanced storage applications.
- All connections to FAStT500 Mini Hubs require the use of GBICs. GBICs are not included.

## FAStT200 Storage Server 35421RU



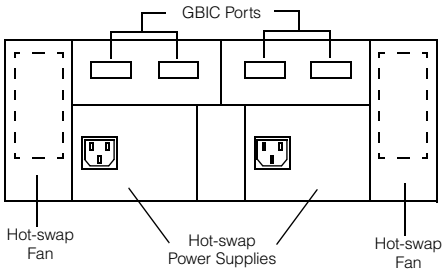

- Contains a single hot-plug, RAID controller which provides a single host Fibre Channel arbitrated loop and a single storage Fibre Channel arbitrated loop.
- Can be upgraded to a FAStT200 HA Storage Server through the addition of a FAStT200 Redundant RAID Controller (P/N 19K1121).
- Integrated 10/100Mbps Ethernet connector and RS-232 service support port.
- Performance optimized for 30 HDDs - supports optional FAStT EXP500 Storage Expansion Units (P/N 35601RU).
- Two hot-swap 350W auto-ranging, redundant power supplies.
- Redundant fans - two hot-swap, dual-fan units.
- LED indicators on all critical components warn of faults, over-temperature, and other abnormalities.
- Ten drive bays - supports slim-high or half-high Fibre Channel hot-swap HDDs.
- Height is 3U (1U=1.75in or 44.45mm.
- Requires Netfinity Enterprise Rack or Expansion Cabinet, Netfinity Rack, Netfinity NetBAY22 or 19in EIA-D industry standard rack. Mounting rails are included with the controller.
- Supports long- and short-wave connections. Requires optional GBICs for each connection. GBICs not included.

## FAStT200 HA Storage Server 35422RU



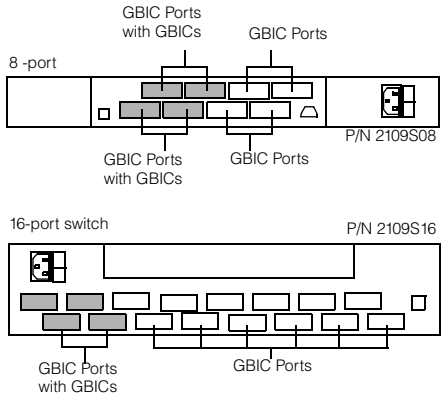

- Contains two hot-plug, RAID controllers. Each controller provides a single host Fibre Channel arbitrated loop and a single storage Fibre Channel arbitrated loop.
- Integrated 10/100Mbps Ethernet connector and RS-232 service support port.
- Performance optimized for 30 HDDs-- supports optional FAStT EXP500 Storage Expansion Units (P/N 35601RU).
- Two hot-swap 350W auto-ranging, redundant power supplies.
- Redundant fans - two hot-swap, dual-fan units.
- LED indicators on all critical components warn of faults, over-temperature, and other abnormalities.
- Ten drive bays - supports slim-high or half-high Fibre Channel hot-swap HDDs.
- Height is 3U (1U=1.75in or 44.45mm).
- Requires Netfinity Enterprise Rack or Expansion Cabinet, Netfinity Rack, Netfinity NetBAY22 or 19in EIA-D industry standard rack. Mounting rails are included with the controller.
- Supports long- and short-wave connections. Requires optional GBICs for each connection. GBICs not included.

## FAStT EXP500 Storage Expansion Unit 35601RU



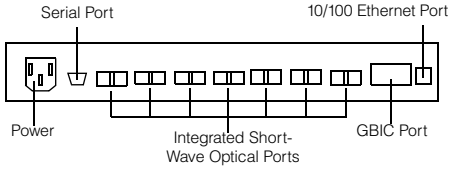

- Two hot-swap, 350W auto-ranging, redundant power supplies.
- Redundant fans - two hot-swap, dual-fan units.
- LED indicators on all critical components warn of faults, over-temperature, and other abnormalities.
- Ten drive bays - supports slim-high or half-high Fibre Channel hot-swap HDDs.
- Height is 3U (1U = 1.75in or 44.45mm).
- Requires Netfinity Enterprise Rack or Expansion Cabinet, Netfinity Rack, Netfinity NetBAY22 or 19in EIA-D Industry-Standard Rack. Mounting rails are included with the controller.
- Requires optional GBICs for each connection. GBICs not included.

## SAN Fibre Channel Switch, 8 and 16 Ports 2109S08/S16




- Each port delivers up to 100MB/sec, full-duplex data transfer.
- Comes with four short-wave GBICs installed.
- Embedded Web browser configuration, management and service.
- Support for Public Fibre Channel Arbitrated Loops.
- Optional power supply (P/N 09L5403) available.
- The 8-port switch is 1U (1U=1.75in or 44.45mm) high and the 16-port switch is 2U (1U=1.75in or 44.45mm) high.

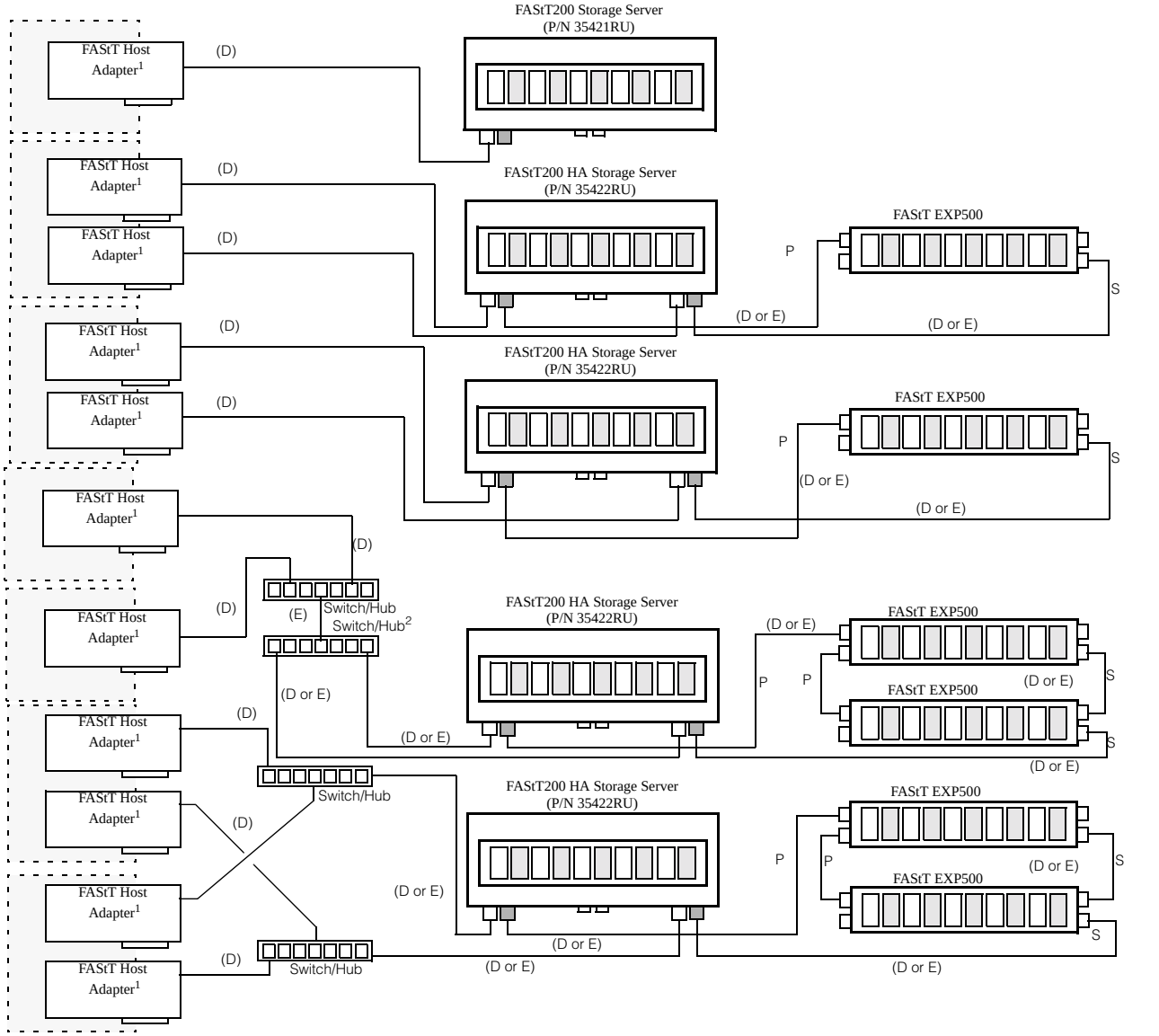
## SAN Fibre Channel Managed Hub 35341RU




- High-speed performance utilizing nonblocking switch-based technology.
- Simultaneous 100MB/sec full duplex data transfers across all ports.
- Eight ports total, one that is configurable with either an optional short-wave or long-wave GBIC and seven integrated short-wave optical ports.
- Support for industry standard MIBs enabling standard SNMP management.
- Height is 1U (1U=1.75in or 44.45mm) high.

## Fibre / Fibre Configuration Examples (FAStT200)

Note: The following sample configurations are for illustration only and may not be suitable for any specific customer installation. Contact your IBM Business Partner or IBM Marketing Representative for assistance with your specific configuration requirements.




1. FAStT Host Adapter (P/N 00N6881) supports short-wave connections only.
2. Buffering the long-wave optic cable expanse with a second switch or hub at the remote storage location is required to requalify the signal. A managed hub supports only one long-wave GBIC.

- P = primary path, S = secondary (redundant) path
- Shaded boxes represent separate hosts.
- Cable groups are represented by letters in parenthesis.
- Maximum of 30 external storage HDDs are supported for optimum performance (up to 10 in the storage server with the remainder in expansion units).
- The number of servers that can be used in configurations with managed hubs or Fibre Channel switches are dependent on partitioning restrictions of the management system or cluster software.
- An optional short- or long-wave GBIC is required for all FAStT200 storage server and FAStT EXP500 storage connections. GBICs are not depicted in these diagrams.
- Other Fibre Channel devices may not require optional GBICs. For specific requirements, see the Fibre Device Ports Reference.

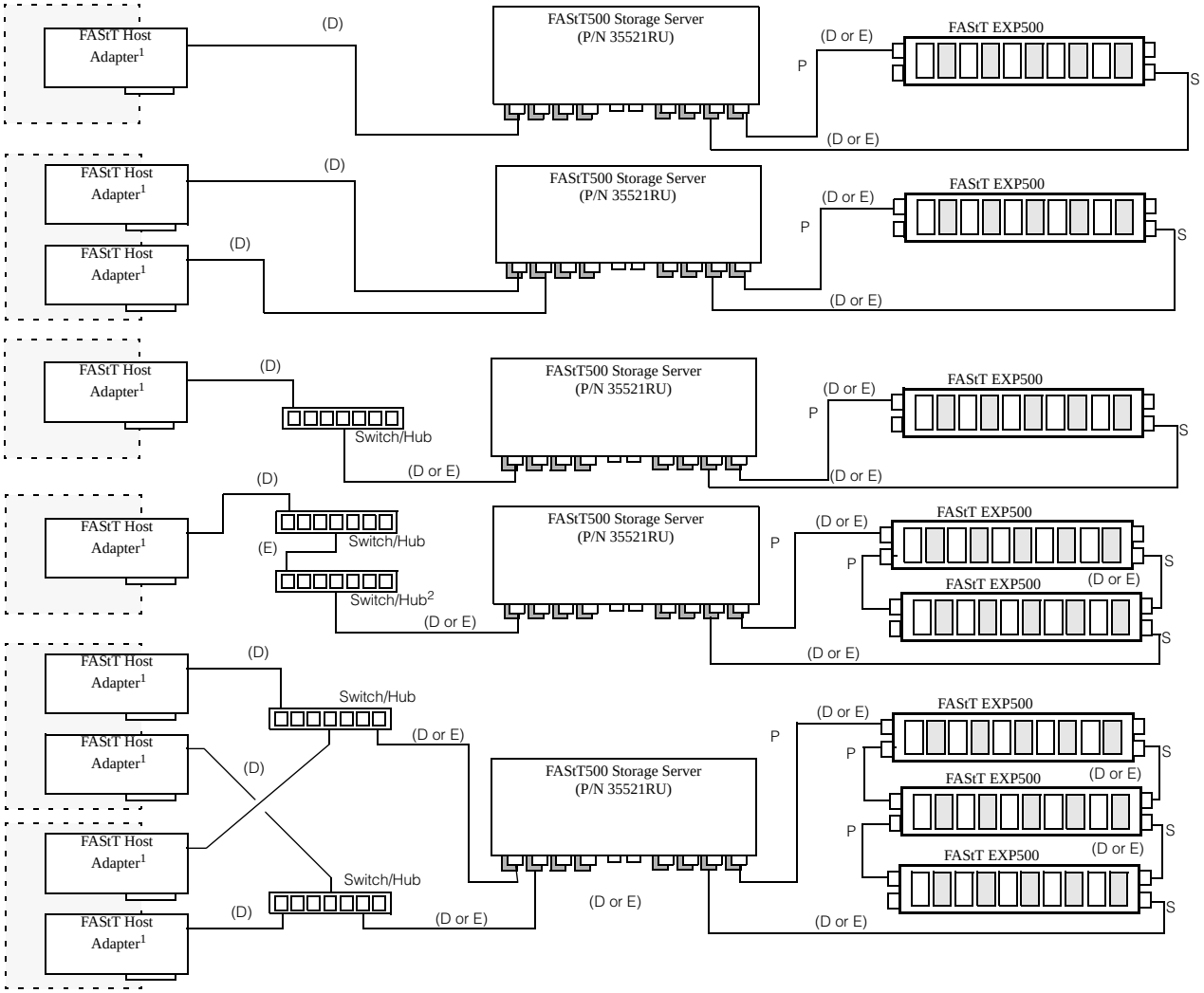
**Cable Group D** (short-wave Fibre Channel)
36L9973 - Netfinity Fibre Channel 1M Cable
03K9306 - Netfinity Fibre Channel 5M Cable
03K9305 - Netfinity Fibre Channel 25M Cable
Customer supplied short-wave cable of up to 500M (0.31 miles)

**Cable Group E** (long-wave Fibre Channel)
Customer supplied long-wave cable of up to 10KM 6.2 miles)

**GBIC**
03K9308 - Netfinity Fibre Channel Short-Wave GBIC
03K9307 - Netfinity Fibre Channel Long-Wave GBIC

## Fibre / Fibre Configuration Examples (FAStT500)

Note: The following sample configurations are for illustration only and may not be suitable for any specific customer installation. Contact your IBM Business Partner or IBM Marketing Representative for assistance with your specific configuration requirements.




1. FAStT Host Adapter (P/N 00N6881) supports shortwave connections only.
2. Buffering the long-wave optic cable expanse with a second switch or hub at the remote storage location is required to requalify the signal.

- P = Primary path, S = Secondary/Redundant path
- Shaded boxes represent separate hosts.
- Cable groups are represented by letters in parenthesis.
- Maximum of 220 external storage HDDs are supported through 11 enclosures in each cable pair.
- The number of servers that can be used in configurations with managed hubs or Fibre Channel switches are dependent on partitioning restrictions of the management system or cluster software.
- An optional short- or long-wave GBIC is required for all FAStT500 storage server and FAStT EXP500 storage connections. GBICs are not depicted in these diagrams.
- Other Fibre Channel devices may not require optional GBICs. For specific requirements, see the Fibre Device Ports Reference.

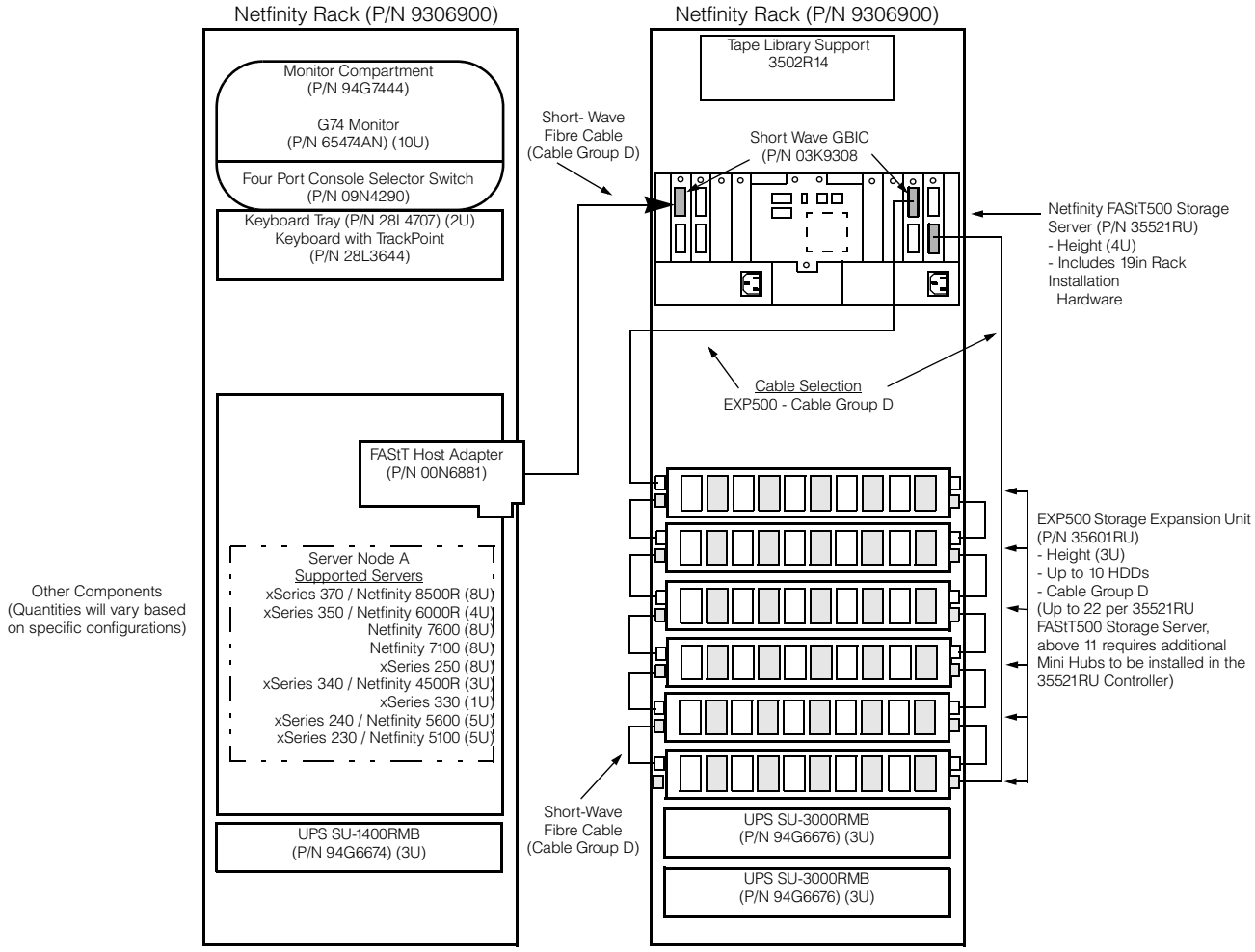
**Cable Group D** (Short-Wave Fibre)
36L9973 - Netfinity Fibre Channel 1M Cable
03K9306 - Netfinity Fibre Channel 5M Cable
03K9305 - Netfinity Fibre Channel 25M Cable
Customer supplied short-wave cable of up to 500M (0.31 miles)

**Cable Group E** (long-wave Fibre Channel)
Customer supplied long-wave cable of up to 10KM (6.2 miles)

**GBIC**
03K9308 - Netfinity Fibre Channel Short-Wave GBIC
03K9307 - Netfinity Fibre Channel Long-Wave GBIC

## High-speed, single-node xSeries and Netfinity Fibre Channel storage configuration offering performance, bandwidth & capacity

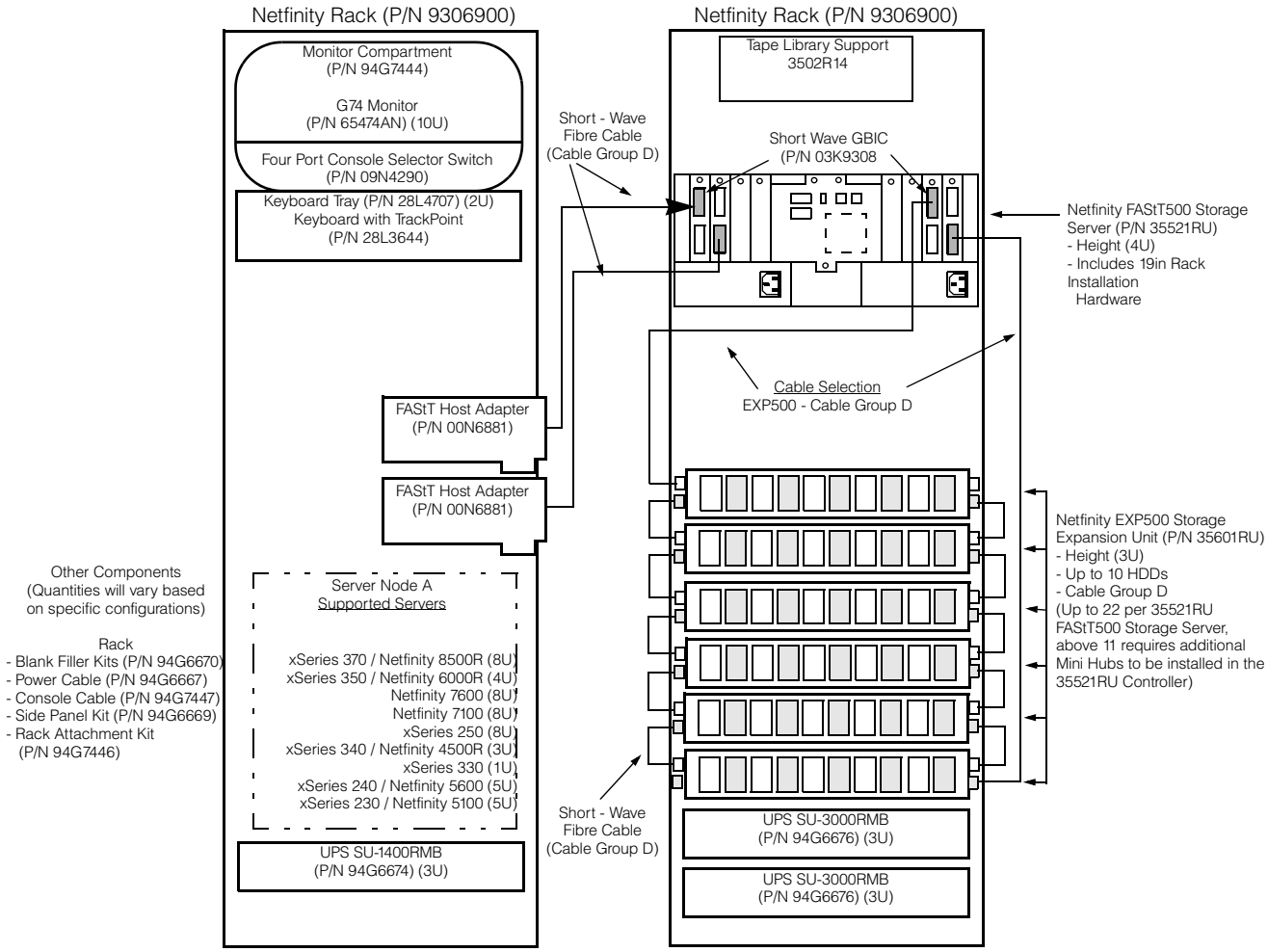
Note: The following sample configurations are for illustration only and may not be suitable for any specific customer installation. Contact your IBM Business Partner or IBM Marketing Representative for assistance with your specific configuration requirements




| | |
|---|---|
| Connector Types<br>68-pin - High Density Connector<br>0.8mm - Very High Density Connection Interface (VHDCI) | Cable Group D (Short-Wave Fibre)<br>36L9973 - Netfinity Fibre Channel 1M Cable<br>03K9306 - Netfinity Fibre Channel 5M Cable<br>03K9305 - Netfinity Fibre Channel 25M Cable<br>Customer supplied short-wave cable of up to 500m (0.31 miles) |
| Cable Group A (0.8mm to 0.8mm)<br>03K9310 - Netfinity 2M Ultra2 SCSI Cable<br>03K9311 - Netfinity 4.2M Ultra2 SCSI Cable<br>37L7101 - Netfinity 20M Ultra2 SCSI Cable | Cable Group E (Long-Wave Fibre)<br>Customer supplied long-wave cable of up to 10km (6.2 miles)<br><br>GBIC<br>03K9308 - Netfinity Fibre Channel Short-Wave GBIC<br>03K9307 - Netfinity Fibre Channel Long-Wave GBIC |

## High-speed, single-node xSeries and Netfinity Fibre Channel storage configuration with Microsoft NT failover support and RAID redundancy for availability, performance and capacity

Note: The following sample configurations are for illustration only and may not be suitable for any specific customer installation. Contact your IBM Business Partner or IBM Marketing Representative for assistance with your specific configuration requirements




Connector Types
68-pin - High Density Connector
0.8mm - Very High Density Connection Interface (VHDCI)

Cable Group A (0.8mm to 0.8mm)
03K9310 - Netfinity 2M Ultra2 SCSI Cable
03K9311 - Netfinity 4.2M Ultra2 SCSI Cable
37L7101 - Netfinity 20M Ultra2 SCSI Cable

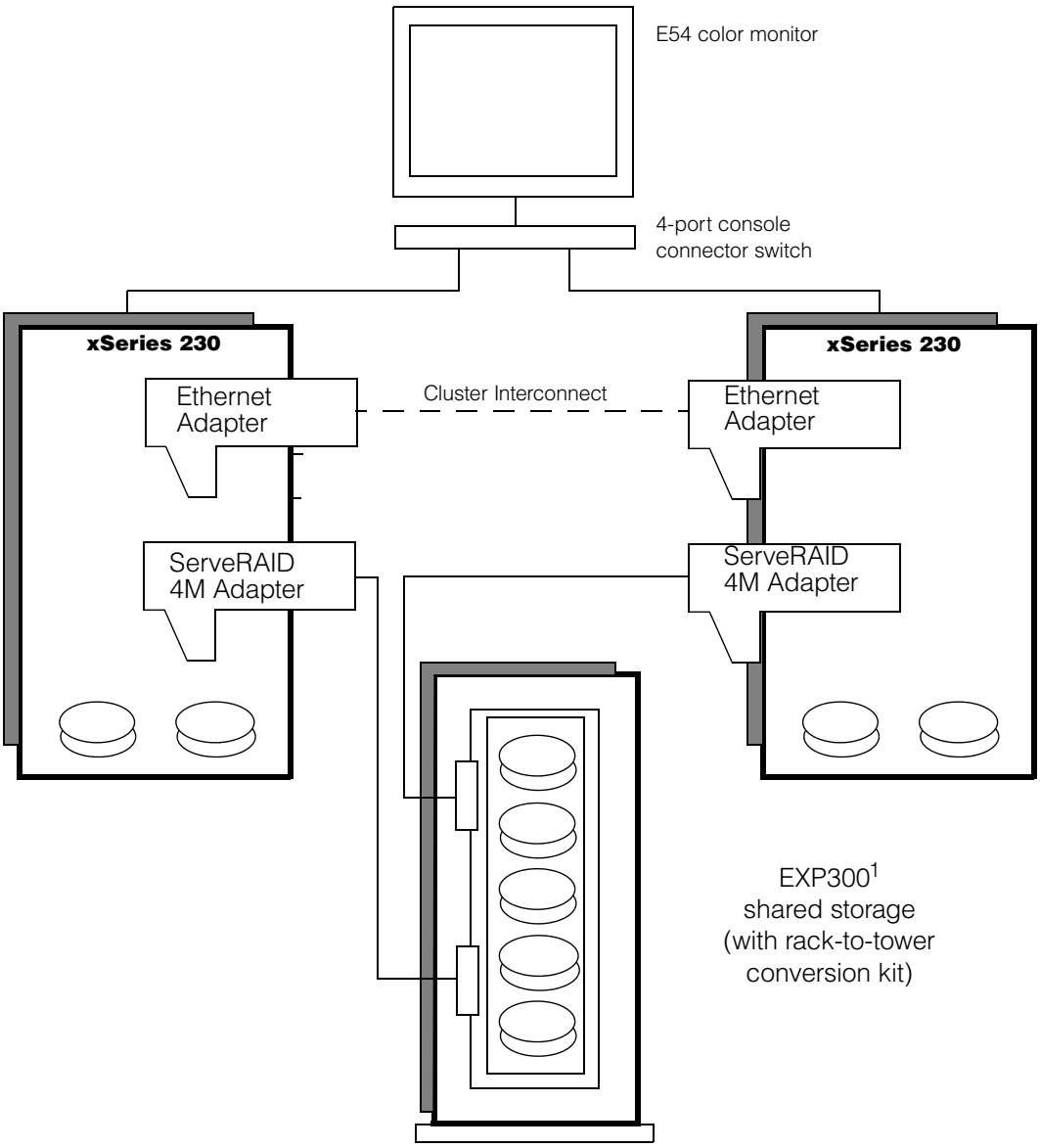
Cable Group D (Short-Wave Fibre)
36L9973 - Netfinity Fibre Channel 1M Cable
03K9306 - Netfinity Fibre Channel 5M Cable
03K9305 - Netfinity Fibre Channel 25M Cable
Customer supplied short-wave cable of up to 500m (0.31 miles)

Cable Group E (Long-Wave Fibre)
Customer supplied long-wave cable of up to 10km (6.2 miles)

GBIC
03K9308 - Netfinity Fibre Channel Short-Wave GBIC
03K9307 - Netfinity Fibre Channel Long-Wave GBIC

# High Availability and Scalable Cluster Solutions

## xSeries 230 High Availability Cluster




1. Configured as a single independent twintail SCSI bus for high availability.

New xSeries 230 cluster solution starts up quick and smart with secure operation of business-critical applications. IBM gives you an easy transition with this complete, test-proven, high availability (HA) hardware and software configuration--it's ready-to-run right out of the box.

These tower solutions leverage the latest xSeries 230 server platform with choices of Windows® network operating system software and preloaded cluster middleware. Features include the following:
- Prepackaged for single part number ordering and customer cost savings
- Scaled for business growth
- Ready-to-run with cluster middleware and either Windows 2000 Advanced Server or Windows NT 4.0 EE operating systems preloaded
- Test-proven high availability hardware and software for business-critical applications
- Flexibility to handle unique computing environments
- Fully redundant with failover protection and RAID-protected internal and external storage

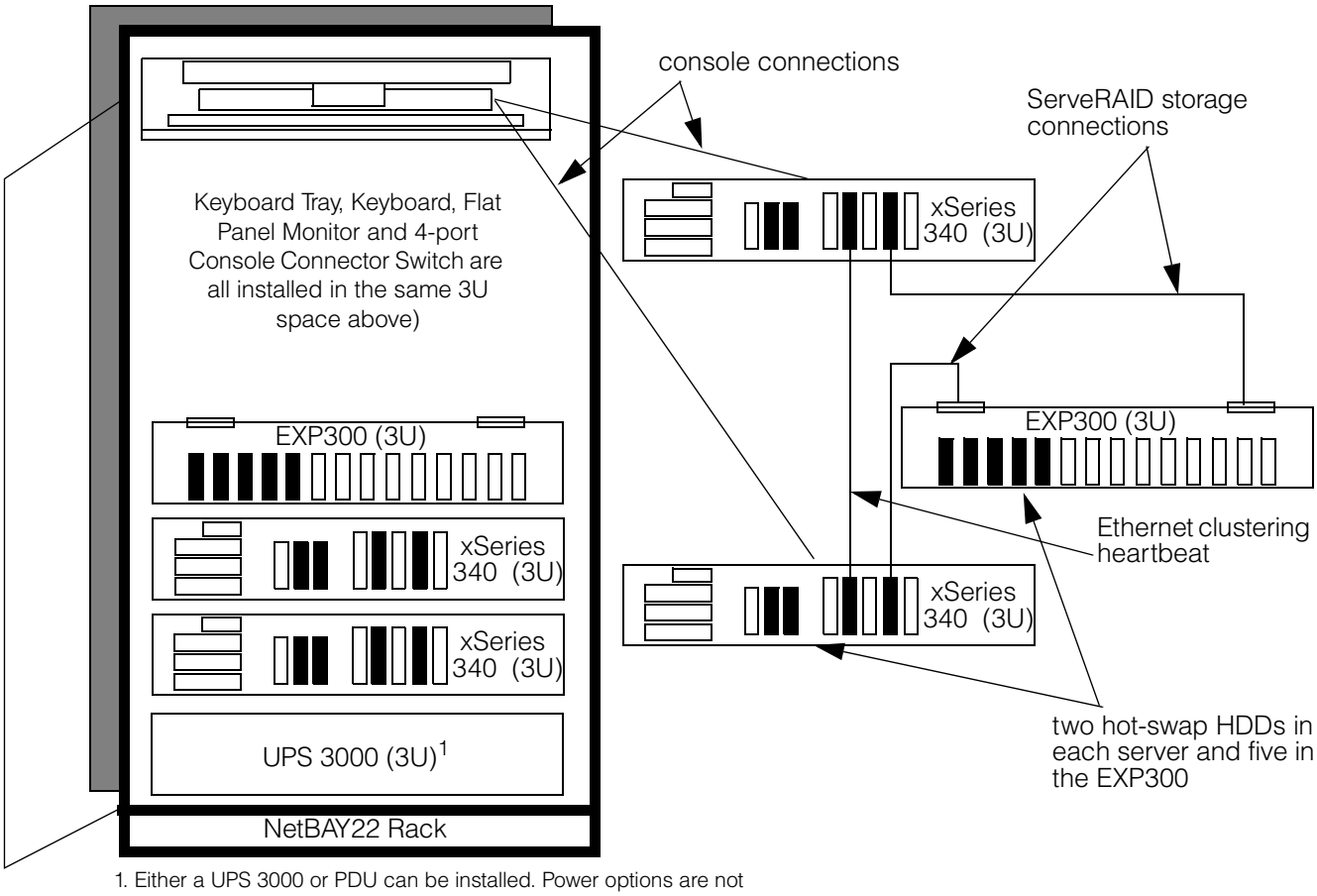
North America order numbers: x230 HA Cluster - NT (P/N 25P1821), x230 HA Cluster - Windows 2000 (P/N 25P1822)

## xSeries 230 High Availability Cluster (P/N 25P1821 and 25P1822)[1]

| Part Number | Server Nodes | Qty | Usage |
|---|---|---|---|
| 865861Y | xSeries 230, 1GHz, 128MB RAM | 2 | cluster nodes, onboard ethernet for public network access |
| 37L7204 | IBM 9.1GB 10K-4 Ultra160 SCSI Hot-swap SL HDD | 4 | 2 per node attached to integrated Ultra160 SCSI Controller |
| 37L6080 | IBM ServeRAID-4M Ultra160 SCSI Controller | 2 | 1 per node for shared storage controller |
| 06P3601 | 10/100 Ethernet Server Adapter | 2 | Clustering Heartbeat |
| | **Storage Subsystem** | | |
| 35311RU | IBM EXP300 External Storage Enclosure | 1 | 1 EXP300 per ServeRAID pair, max of 14 Ultra160 HDDs |
| 09N7296 | Netfinity EXP300 Rack-to-Tower Conversion Kit | 1 | convert standard rack-mount device to tower |
| 37L7205 | IBM 18.2GB 10K-4 Ultra160 SCSI Hot-swap HDD | 5 | RAID 5 shared storage in EXP300 |
| 03K9310 | Netfinity 2M Ultra2 SCSI Cable | 1 | server to EXP300 (EXP300 ships with one 2M cable) |
| | **Cluster Interconnect** | | |
| 19K5788 | Ethernet Cluster Interconnect Cable | 1 | Ethernet Crossover for interconnection between clustered nodes |
| | **Monitor / Console** | | |
| 6331N2N | E54 Color Monitor - 15in (13.7in viewable image size) | 1 | |
| 09N4290 | Netfinity Console Server Selector Switch (4-port) | 1 | |
| 09N4293 | 7ft Console Cable Set | 2 | 1 console set per node |
| 2446177 | Solution Integration Charge | 2 | |
| 06P4610 | Cluster Bundle Publications Pack for xSeries 230 | 1 | |
| | **Preloaded Software (specify option)** | | Select Windows NT 4.0EE or Windows 2000 Advanced Server |
| 01N0985 | Microsoft Windows NT Server 4.0EE with MSCS | 1 | NOS and Cluster Middleware preloaded |
| 01N0986 | Windows 2000 Advanced Server | 1 | NOS and Cluster Middleware preloaded |
| | **Recommended Options** | | |
| 19K4640 | xSeries 1GHz/256KB Upgrade with Pentium III Processor | 2 | SMP for nodes |
| 33L3123 | IBM 128MB 133MHz SDRAM ECC RDIMM II | 2 | Memory upgrade |
| 37L7205 | IBM 18.2GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD | 9 | RAID 5 shared storage in EXP300 |
| 01K7209 | Netfinity Advanced Systems Management PCI Adapter | 1 | 1 per cluster |
| 03K9309 | Netfinity Advanced Systems Management Interconnect | 1 | 1 included with PCI adapter, 1 option required for second system |
| 33L4618 | PCI V90 56 Data/Fax Modem | 2 | communications (1 per node) |
| 00N7990 | 40/80GB Internal DLT Tape Drive | 1 | tape back-up |
| 94G3136 | APC Smart-UPS 1400 | 1 | |

1. P/N 25P1821 includes Windows NT EE as the operating system for this integrated tower solution. P/N 25P1822 uses Windows 2000 Advanced Server.

## xSeries 340 High Availability Cluster


console connections
ServeRAID storage connections
Keyboard Tray, Keyboard, Flat Panel Monitor and 4-port Console Connector Switch are all installed in the same 3U space above)
xSeries 340 (3U)
EXP300 (3U)
xSeries 340 (3U)
xSeries 340 (3U)
UPS 3000 (3U)[1]
NetBAY22 Rack
EXP300 (3U)
Ethernet clustering heartbeat
xSeries 340 (3U)
two hot-swap HDDs in each server and five in the EXP300

1. Either a UPS 3000 or PDU can be installed. Power options are not shipped standard with the cluster bundle. Power connections are not represented in this diagram.

New xSeries 340 cluster solution starts up quick and smart with secure operation of business-critical applications. IBM gives you an easy transition with this complete, test-proven, high availability (HA) hardware and software configuration--it's ready-to-run right out of the box.

These rack solutions leverage the latest xSeries 340 server platform with choices of Windows® network operating system software and preloaded cluster middleware. Features include the following:

- Prepackaged for single part number ordering and customer cost savings
- Scaled for business growth
- Ready-to-run with cluster middleware and either Windows 2000 Advanced Server or Windows NT 4.0 EE operating systems preloaded
- Test-proven high availability hardware and software for business-critical applications
- Flexibility to handle unique computing environments
- Fully redundant with failover protection and RAID-protected internal and external storage

North America order numbers: x340 HA Cluster - NT (P/N 25P1823), x340 HA Cluster - Windows 2000 (P/N 25P1824)

## xSeries 340 High Availability Cluster (P/N 25P1823 and 25P1824)[1]

| Part Number | Server Nodes | Qty | Usage |
|---|---|---|---|
| 86566RY | xSeries 340, 1GHz, 128MB RAM | 2 | cluster nodes, onboard ethernet for public network access |
| 37L7204 | IBM 9.1GB 10K-4 Ultra160 SCSI Hot-swap SL HDD | 4 | 2 per node attached to integrated Ultra160 SCSI Controller |
| 37L6080 | IBM ServeRAID-4M Ultra160 SCSI Controller | 2 | 1 per node for shared storage controller |
| 06P3601 | 10/100 Ethernet Server Adapter | 2 | Clustering Heartbeat |
| | **Storage Subsystem** | | |
| 35311RU | IBM EXP300 External Storage Enclosure | 1 | 1 EXP300 per ServeRAID pair, max of 14 Ultra160 HDDs |
| 37L7205 | IBM 18.2GB 10K-4 Ultra160 SCSI Hot-swap SL HDD | 5 | RAID 5 shared storage in EXP300 |
| 03K9310 | Netfinity 2M Ultra2 SCSI Cable | 1 | server to EXP300 (EXP300 ships with one 2M cable) |
| | **Rack, Monitor, Console** | | |
| 9306200 | NetBAY22 Rack | 1 | 22U rack cabinet |
| 9511AG4 | T540 Flat Panel Monitor | 1 | |
| 37L6888 | Flat Panel Monitor Rack Kit | 1 | |
| 28L4707 | Netfinity Rack Keyboard Tray | 1 | |
| 28L3644 | Space Saver Keyboard | 1 | |
| 09N4290 | Netfinity Console Server Selector Switch (4-port) | 1 | |
| 09N4293 | 7ft Console Cable Set | 2 | 1 console set per node |
| 94G6670 | Blank Filler Panel Kit | 1 | |
| 2446177 | Solution Integration Charge | 2 | |
| 06P4610 | Cluster Bundle Publications Pack for xSeries 230 | 1 | |
| | **Cluster Interconnect** | | |
| 19K5788 | Ethernet Cluster Interconnect Cable | 1 | Ethernet Crossover for interconnection between clustered nodes |
| | **Preloaded Software (specify option)** | | Select Windows NT 4.0EE or Windows 2000 Advanced Server |
| 01N0985 | Microsoft Windows NT Server 4.0EE with MSCS | 1 | NOS and Cluster Middleware preloaded |
| 01N0986 | Windows 2000 Advanced Server | 1 | NOS and Cluster Middleware preloaded |
| | **Recommended Options** | | |
| 19K4640 | xSeries 1GHz/256KB Upgrade with Pentium III Processor | 2 | SMP for nodes |
| 33L3123 | IBM 128MB 133MHz SDRAM ECC RDIMM II | 2 | Memory upgrade |
| 37L7205 | IBM 18.2GB 10K-4 Ultra160 SCSI Hot-swap SL HDD | 9 | RAID 5 shared storage in EXP300 |
| 01K7209 | Netfinity Advanced Systems Management PCI Adapter | 1 | 1 per cluster |
| 03K9309 | Netfinity Advanced Systems Management Interconnect | 1 | 1 included with PCI adapter, 1 option required for second system |
| 33L4618 | PCI V90 56 Data/Fax Modem | 2 | communications (1 per node) |
| 00N7990 | 40/80GB Internal DLT Tape Drive | 1 | tape back-up |
| 94G6676 | APC Smart-UPS 3000RMB | 1 | |
| 37L6866 | NetBAY Rack PDU | 2 | |

1. P/N 25P1823 includes Windows NT EE as the operating system for this integrated rack solution. P/N 25P1824 uses Windows 2000 Advanced Server.

# IBM Datacenter Solutions

IBM's new Datacenter Solution Program is a comprehensive set of product and service offerings intended to deliver true enterprise computing solutions based on the Microsoft® Windows® 2000 Datacenter Server operating system. The Windows 2000 Datacenter Server product runs on the new xSeries 370 rack-mounted server, which offers up to 8-way processing, up to 32GB of memory[1], Fibre Channel and SCSI storage, and 12 PCI slots. The Datacenter Solution can be ordered in one- and two-node configurations from the bundles shown here, and in three- and four-node configurations by ordering additional nodes. The bundles illustrated here are base configurations that can be expanded to meet your needs. The IBM Datacenter Solution includes not only Microsoft-certified hardware, but also the Windows Datacenter Server operating system preloaded and a set of required services. In addition, a wide variety of optional services are available from IBM to meet your specifications.

In addition to the information on the following pages, the IBM Datacenter Solution Program includes the following software and required services. The services products must be ordered separately. A complete Solutions Assurance review will be conducted by IBM to ensure that the configuration being ordered is complete.

Software

Microsoft Windows 2000 Datacenter Server, licensed for up to 8 CPU's[2]
(Client Access Licenses to be purchased separately)
IBM Director 2.2
IBM Director Universal Management Services
APC UPS Software

Required IBM Services

Limited Warranty[3] service upgrade (24x7x4 hour response)
Factory installation and on-site setup
Advanced Support for Mission Critical Systems

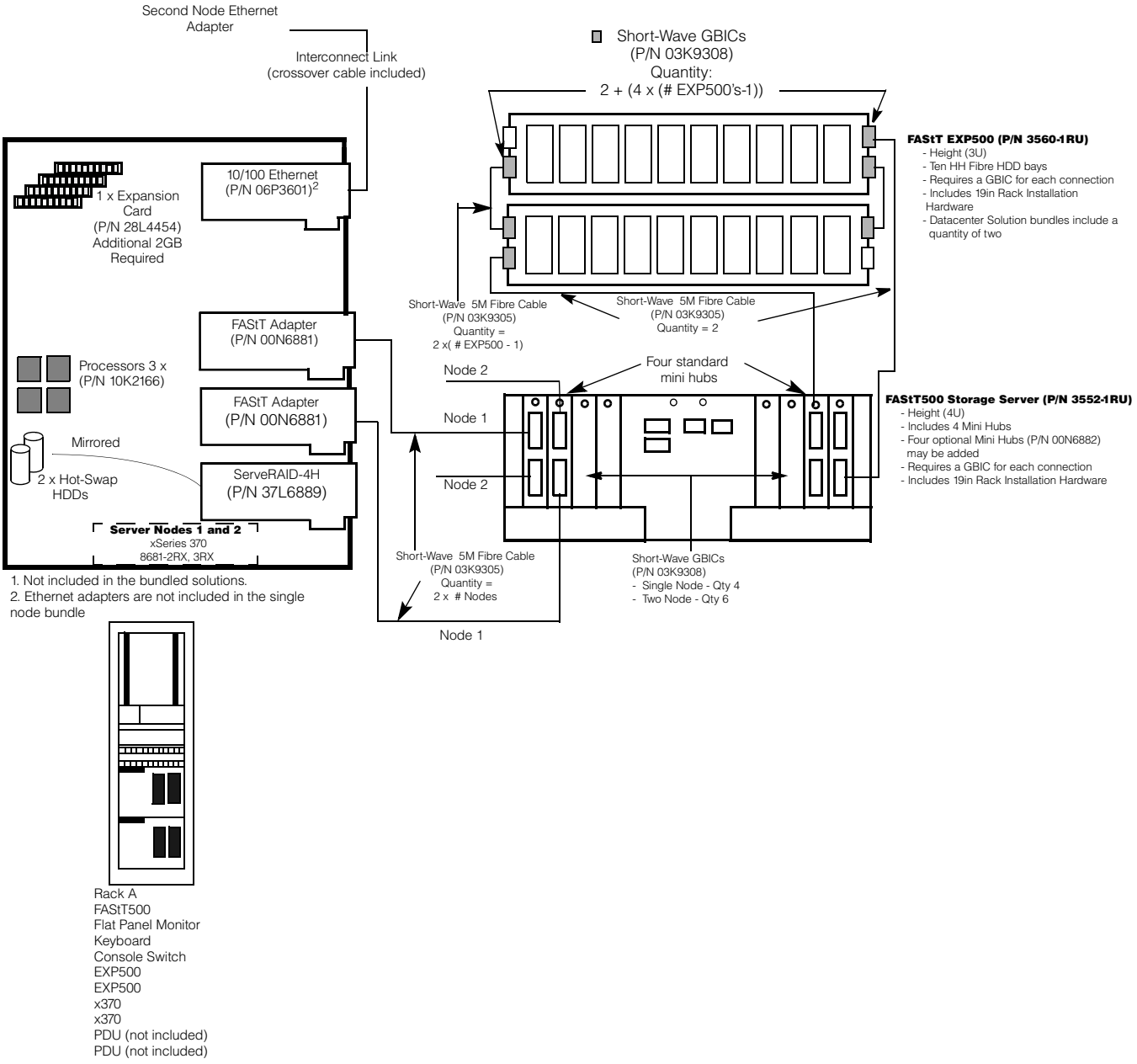
Optional IBM Services

High Availability Services[4] (including up to 99.99% availability guarantee in the US)
xSeries 99.9% High Availability Guarantee[5] outside of the US
Warranty service upgrade (24x7x2 hour response)
Operational Support Services--electronic systems management, account advocate, and more
Testing services--proof of concept, assessment, design, and planning
Business Continuity and Recovery Services
Custom services for unique requirements

1. Maximum memory may require replacement of standard memory with optional maximum memory module.
2. IBM makes no representations or warranties regarding non-IBM products or services. These products are offered and warranted by third parties.
3. For information on IBM's Statement of Limited Warranty, please call 1-800-772-2227 or contact your IBM representative or reseller. Copies are available upon request. International Warranty Service available in those countries where the particular product is sold by IBM or IBM Business Partners (registration required). With respect to onsite service, IBM sends a technician after attempting to resolve the problem remotely.
4. The High Availability Services for Business Critical Systems offering for an availability guarantee is an optional service and is only offered for eligible xSeries environments at this time. IBM reserves the right to change the terms and conditions of the program at any time, without notice. For more details, refer to www-1.ibm.com/services/its/us/highavail2.html.
5. The xSeries 99.9% High Availability Guarantee program is an optional offering on eligible xSeries configurations. IBM reserves the right to change the terms and conditions of the program at any time, without notice. For more details, refer to www.pc.ibm.com/ww/eserver/xseries/999guarantee.html.

# Datacenter Solutions

The product content described here is consistent worldwide; however, there may be some variance in IBM part numbers outside of the US and Canada. Contact your IBM Business Partner or IBM Marketing Representative for assistance with your specific configuration requirements


Second Node Ethernet Adapter
Interconnect Link (crossover cable included)
Short-Wave GBICs (P/N 03K9308) Quantity: 2 + (4 x (# EXP500's-1))
FAStT EXP500 (P/N 3560-1RU)
- Height (3U)
- Ten HH Fibre HDD bays
- Requires a GBIC for each connection
- Includes 19in Rack Installation Hardware
- Datacenter Solution bundles include a quantity of two
10/100 Ethernet (P/N 06P3601)2
1 x Expansion Card (P/N 28L4454) Additional 2GB Required
FAStT Adapter (P/N 00N6881)
Processors 3 x (P/N 10K2166)
FAStT Adapter (P/N 00N6881)
Mirrored
2 x Hot-Swap HDDs
ServeRAID-4H (P/N 37L6889)
Server Nodes 1 and 2
xSeries 370
8681-2RX, 3RX
Short-Wave 5M Fibre Cable (P/N 03K9305) Quantity = 2 x( # EXP500 - 1)
Short-Wave 5M Fibre Cable (P/N 03K9305) Quantity = 2
Node 2
Four standard mini hubs
Node 1
Node 2
FAStT500 Storage Server (P/N 3552-1RU)
- Height (4U)
- Includes 4 Mini Hubs
- Four optional Mini Hubs (P/N 00N6882) may be added
- Requires a GBIC for each connection
- Includes 19in Rack Installation Hardware
Short-Wave 5M Fibre Cable (P/N 03K9305) Quantity = 2 x # Nodes
Short-Wave GBICs (P/N 03K9308)
- Single Node - Qty 4
- Two Node - Qty 6
Node 1
Rack A
FAStT500
Flat Panel Monitor
Keyboard
Console Switch
EXP500
EXP500
x370
x370
PDU (not included)
PDU (not included)

1. Not included in the bundled solutions.
2. Ethernet adapters are not included in the single node bundle

# IBM Datacenter Solution - Single Node (P/N 21P9961)

| Bundle (P/N 21P9961) Components | IBM Datacenter Solution - Single Node (P/N 21P9961) includes the part numbers and quantities identified in this table. Required options must be purchased separately and are identified in the table labeled "Required Options." Additional options for IBM Datacenter Solutions are listed in the table labeled "Selectable Options." All final customer configurations and solutions require IBM Solution Assurance Approval. | | | Limited Warranty Service 24x7x4 hrs | Limited Warranty Service 24x7x2 hrs[1] |
|---|---|---|---|---|---|
| **Part Number** | **Description** | **Qty** | **Usage** | **Part Number** | **Part Number** |
| | **Server Node** | | | | |
| | **Select from two server models:** | | | | |
| 8681-3RX | xSeries 370 900MHz[2]/2MB, 512MB ECC, OPEN, 48X, PCI (Rack 8U) | 1 or | | 41L2742 | 41L2743 |
| 8681-2RX | xSeries 370 700MHz/2MB, 512MB ECC, OPEN, 48X, PCI (Rack 8U) | 1 | | 41L2742 | 41L2743 |
| | **Select from two processor upgrades:** | | **Processor upgrades must match standard processor.** | | |
| 19K4637 | xSeries 370 900MHz/2MB Upgrade with Pentium® III Xeon™ Processor | 3 or | Total of 4 SMP processors per node | N/A | N/A |
| 10K2166 | Netfinity® 8500R 700MHz/2MB Upgrade with Pentium III Xeon Processor | 3 | Total of 4 SMP processors per node | N/A | N/A |
| 28L4454 | Netfinity 8500R Memory Expansion Card | 1 | Enables cache line interleaving and requires installation of matched RDIMM pairs | N/A | N/A |
| 37L6889 | ServeRAID™-4H Ultra160 SCSI Controller | 1 | Provides NOS mirroring on internal HDDs | N/A | N/A |
| 00N6881 | Netfinity FAStT Host Adapter | 2 | Redundant paths to external storage subsystems | N/A | N/A |
| | **Storage Subsystems** | | | | |
| 35521RU | FAStT500 Storage Server | 1 | Provides for redundant paths from the server to the storage unit | 41L2768 | 41L2769 |
| 35601RU | FAStT EXP500 Storage Expansion Unit | 2 | HDDs should be added in matched pairs | 41L2766 | 41L2767 |
| | **Storage Cables** | | Calculations assume no switches are installed | | |
| 03K9306 | Netfinity Fibre Channel 5M Cable | 6 | Redundant Paths: Nodes - Storage Server - EXP500 | N/A | N/A |
| 03K9308 | Netfinity Fibre Channel Short-Wave GBIC | 10 | Redundant Paths: (2 x # Nodes + 4) +4 x (# EXP500's - 1) | N/A | N/A |
| | **Other Non-Rack** | | | | |
| 9511AG4 | T540 Flat Panel Color Monitor 15in (381mm, 15in viewable image), stealth black | 1 | | 30L9183 | N/A |
| 28L3644 | Space Saver II Keyboard | 1 | | N/A | N/A |
| | **Rack and Related Components** | | | | |
| 930842S | NetBAY42 Enterprise Rack Cabinet (ER) | 1 | | 41L2762 | 41L2763 |
| 94G6670 | Blank Filler Panel Kit | 3 | Fills empty front panel space to control air flow | N/A | N/A |
| 28L4707 | Netfinity Rack Keyboard Tray | 1 | Supports Flat Panel Monitor with Kit 37L6888 and stowage of Keyboard 28L3644 in a ready-to-use position. | N/A | N/A |
| 37L6888 | Netfinity Flat Panel Monitor Rack Mount Kit II | 1 | Required for installing flat panel monitor in keyboard tray 28L4707 | N/A | N/A |
| 09N4290 | NetBAY™ 1x4 Console Switch | 1 | Attaches up to 4 nodes to a single monitor, keyboard and mouse. | N/A | N/A |
| 94G7447 | NetBAY Console Cable Set 12ft (3.66m) | 1 | Attaches each node to a Console Server Selector Switch | N/A | N/A |
| 94G7448 | Power Cable Type C12 (3.7m, 12ft) | 6 | Provides IEC 320-C13 (Device) to IEC 320-C14 (Power Unit) power cord. | N/A | N/A |
| | **Publications and Software** | | | | |
| 22P4745 | OS Preload Kit / Ship Group | 1 | | N/A | N/A |
| | **Services** | | | | |
| 06P7505 | Image Load Fee | 1 | | N/A | N/A |
| 06P7514 | Enterprise Rack Prep Fee | 1 | | N/A | N/A |
| 06P7515 | Enterprise Rack Installation Fee | 4 | | N/A | N/A |
| 06P7495 | Option Install Fee | 7 | Quantity equals the number of options installed. | N/A | N/A |

1. This Service offering is not available in all countries and is limited to selected areas (see Fax #8146 on 1-800-IBM-4FAX).
2. MHz/GHz only measures microprocessor internal clock speed; many factors affect application performance.

All final customer configurations and solutions require IBM Solution Assurance Approval.

# IBM Datacenter Solution - Two Node (P/N 21P9962)

| Bundle (P/N 21P9962) Components | IBM Datacenter Solution - Two Node (P/N 21P9962) includes the part numbers and quantities identified in this table. Required options must be purchased separately and are identified in the table labeled "Required Options." Additional options for IBM Datacenter Solutions are listed in the table labeled "Selectable Options." All final customer configurations and solutions require IBM Solution Assurance Approval. | | | | Limited Warranty Service 24x7x4 hrs | Limited Warranty Service 24x7x2 hrs[1] |
|---|---|---|---|---|---|---|
| **Part Number** | **Description** | **Qty/ Node** | **Total Qty** | **Usage** | **Part Number** | **Part Number** |
| | **Server Nodes 1 and 2** | | | | | |
| | **Select from two server models[2]:** | | | | | |
| 8681-3RX | xSeries 370 900MHz/2MB, 512MB ECC, OPEN, 48X, PCI (Rack 8U) | 1 | 2 or | | 41L2742 | 41L2743 |
| 8681-2RX | xSeries 370 700MHz/2MB, 512MB ECC, OPEN, 48X, PCI (Rack 8U) | 1 | 2 | | 41L2742 | 41L2743 |
| | **Select from two processor upgrades:** | | | **Processor upgrades must match standard processor.** | | |
| 19K4637 | xSeries 370 900MHz/2MB Upgrade with Pentium III Xeon Processor | 3 | 6 or | Total of 4 SMP processors per node | N/A | N/A |
| 10K2166 | Netfinity 8500R 700MHz/2MB Upgrade with Pentium III Xeon Processor | 3 | 6 | Total of 4 SMP processors per node | N/A | N/A |
| 28L4454 | Netfinity 8500R Memory Expansion Card | 1 | 2 | Enables cache line interleaving and requires installation of matched RDIMM pairs. | N/A | N/A |
| 37L6889 | ServeRAID-4H Ultra160 SCSI Controller | 1 | 2 | Provides NOS mirroring on internal HDDs. | N/A | N/A |
| 00N6881 | Netfinity FAStT Host Adapter | 2 | 4 | Redundant paths to external storage subsystems | N/A | N/A |
| | **Storage Subsystems** | | | | | |
| 35521RU | FAStT500 Storage Server | - | 1 | | 41L2768 | 41L2769 |
| 35601RU | FAStT EXP500 Storage Expansion Unit | - | 2 | | 41L2766 | 41L2767 |
| | **Storage Cables** | | | Calculations assume no switches are installed | | |
| 03K9306 | Netfinity Fibre Channel 5M Cable | - | 8 | Redundant Paths: Nodes - Storage Server - EXP500 | N/A | N/A |
| 03K9308 | Netfinity Fibre Channel Short-Wave GBIC | - | 12 | Redundant Paths: (2 x # Nodes + 4) +4 x (# EXP500's - 1) | N/A | N/A |
| | **Interconnect Components** | | | | | |
| 19K5788 | 25ft Ethernet Crossover Cable | - | 1 | Interconnects 2 nodes without an Ethernet switch | N/A | N/A |
| 06P3601 | 10/100 Ethernet Server Adapter | 1 | 2 | Node to node interconnect | N/A | N/A |
| | **Other Non-Rack** | | | | | |
| 9511AG4 | T540 Flat Panel Color Monitor 15in (381mm, 15in viewable image), stealth black | - | 1 | | 30L9183 | N/A |
| 28L3644 | Space Saver II Keyboard | - | 1 | | N/A | N/A |
| | **Rack and Related Components** | | | | | |
| 930842S | NetBAY42 Enterprise Rack Cabinet (ER) | - | 1 | | 41L2762 | 41L2763 |
| 94G6670 | Blank Filler Panel Kit | - | 2 | Fills empty front panel space to control air flow | N/A | N/A |
| 28L4707 | Netfinity Rack Keyboard Tray | - | 1 | Supports Flat Panel Monitor with Kit 37L6888 and stowage of Keyboard 28L3644 in a ready-to-use position. | N/A | N/A |
| 37L6888 | Netfinity Flat Panel Monitor Rack Mount Kit II | - | 1 | Required for installing flat panel monitor in keyboard tray 28L4707 | N/A | N/A |
| 09N4290 | NetBAY 1x4 Console Switch | - | 1 | Attaches up to 4 nodes to a single monitor, keyboard and mouse. | N/A | N/A |
| 94G7447 | NetBAY Console Cable Set 12ft (3.66m) | 1 | 2 | Attaches each node to a Console Server Selector Switch | N/A | N/A |
| 94G7448 | Power Cable Type C12 (3.7m, 12ft) | - | 7 | Provides IEC 320-C13 (Device) to IEC 320-C14 (Power Unit) power cord | N/A | N/A |
| | **Publications and Software** | | | | | |
| 22P4745 | OS Preload Kit / Ship Group | 1 | 2 | | N/A | N/A |
| | **Services** | | | | | |
| 06P7505 | Image Load Fee | 1 | 2 | | N/A | N/A |
| 06P7514 | Enterprise Rack Prep Fee | - | 1 | Quantity equals the number of racks | N/A | N/A |
| 06P7515 | Enterprise Rack Installation Fee | - | 5 | Quantity equals the number of major rack components installed | N/A | N/A |
| 06P7495 | Option Install Fee | 8 | 16 | Quantity equals the number of options installed | N/A | N/A |

1. This Service offering is not available in all countries and is limited to selected areas (see Fax #8146 on 1-800-IBM-4FAX).
2. IBM Datacenter Solutions support configurations using one or both available xSeries 370 server models.

All final customer configurations and solutions require IBM Solution Assurance Approval.

## IBM Datacenter Solution - Required Options

| Required Options | Required Options provide alternative methods of meeting minimum memory and storage requirements. Customer requirements will vary; therefore, these options are configured and purchased separate from the base solution bundle. All final customer configurations and solutions require IBM Solution Assurance Approval. | | | Limited Warranty Service 24x7x4 hrs | Limited Warranty Service 24x7x2 hrs[1] |
|---|---|---|---|---|---|
| **Part Number** | **Description** | **Qty/ Node** | **Usage** | **Part Number** | **Part Number** |
| Select one of the three memory options per node. | | RDIMMs must be added in matched pairs within each node. A minimum of 2GB must be added to each bundled node. | | | |
| 33L3056 | Netfinity 1GB SDRAM ECC RDIM II | 2 + 2N | Minimum of 2 | N/A | N/A |
| 20L0249 | Netfinity 512MB SDRAM ECC RDIMM II | 4 + 2N | Minimum of 4 | N/A | N/A |
| 33L3149 | 512MB 100MHz ECC SDRAM RDIMM | 4 + 2N | Minimum of 4 | N/A | N/A |
| Select one of the two internal HDD options per node | | | Two HDDs must be installed in each node | | |
| 37L7203 | 36.4GB[2] Ultra160 SCSI Hot-Swap SL HDD | 2 | Internal HDDs for NOS installation | N/A | N/A |
| 37L7206 | 36.4GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD | 2 | Internal HDDs for NOS installation | N/A | N/A |
| Select F/C HDD options (multiple of 2) per bundle | | A minimum of 2 HDDs must be installed, one in each FAStT500 Storage Expansion Unit. Additional HDDs must be installed in multiples of 2. | | | |
| 06P5707 | Netfinity 18.2GB 15Krpm FC Hot-Swap HDD | | Install in EXP500s | N/A | N/A |
| 19K0652 | 18.2GB 10K-4 FC Hot-Swap HDD | | Install in EXP500s | N/A | N/A |
| 19K0653 | 36.4GB 10K-4 FC Hot-Swap HDD | | Install in EXP500s | N/A | N/A |
| 19K0654 | 73.4GB 10K-4 FC Hot-Swap HDD | | Install in EXP500s | N/A | N/A |
| Select one of the two Warrany Services per bundle | | | | | |
| 24X7X4 option | Use the above applicable P/Ns with the right quantity | | | | |
| 24X7X2 option | Use the above applicable P/Ns with the right quantity | | | | |

1. This Service offering is not available in all countries and is limited to selected areas (see Fax #8146 on 1-800-IBM-4FAX).
2. GB equals one billion bytes when referring to internal storage capacity; total user-accessible capacity may be less.

All final customer configurations and solutions require IBM Solution Assurance Approval.

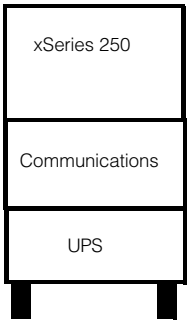
# IBM Datacenter Solution - Selectable Options

| Selectable Options | Selectable options are not required but are compatible for use with IBM Datacenter bundles. A comprehensive list of supported options can be found at www.developer.ibm.com/welcome/netfinity, under 'NEWS' select 'Solutions Library,' perform a search for 'Microsoft,' click on 'Windows 2000 Datacenter Server.' All final customer configurations and solutions require IBM Solution Assurance Approval. | | Limited Warranty Service 24x7x4 hrs | Limited Warranty Service 24x7x2 hrs[1] | Enterprise Rack Assembly Fee |
|---|---|---|---|---|---|
| **Part Number** | **Description** | **Usage** | **Part Number** | **Part Number** | **Part Number** |
| 21P9960[2] | Datacenter Server Bundle-Additional node | Preloaded xSeries 370 2RX or 3RX for nodes 3 and 4. | 41L2742 | 41L2743 | 21P3342 |
| 19K4637[3] | xSeries 370 900MHz/2MB Upgrade with Pentium III Xeon Processor | xSeries 370 supports up to 8 SMP processors. Installation of 5 or more requires Filter and Expansion Kits (P/N 10K2335 and 10K2337) | N/A | N/A | N/A |
| 10K2166[3] | Netfinity 8500R 700MHz/2MB Upgrade with Pentium III Xeon Processor | xSeries 370 supports up to 8 SMP processors. Installation of 5 or more requires Filter and Expansion Kits (P/N 10K2335 and 10K2337) | N/A | N/A | N/A |
| 10K2337 | Netfinity Mezzanine Expansion Kit | Required for installation of processors 5 through 8. Requires Filter (P/N 10K2335) | | | |
| 10K2335 | Netfinity 4X Accelerator Filter | Required when installing Mezzanine Expansion Kit (P/N 10K2337) | | | |
| 00N6881 | Netfinity FAStT Host Adapter | | N/A | N/A | N/A |
| 35521RU | FAStT500 Storage Server | | 41L2768 | 41L2769 | 21P3342 |
| 35601RU | FAStT500 Storage Expansion Unit | | 41L2766 | 41L2767 | 21P3342 |
| 36L9973 | Netfinity Fibre Channel 1M Cable | | N/A | N/A | N/A |
| 03K9306 | Netfinity Fibre Channel 5M Cable | | N/A | N/A | N/A |
| 03K9308 | Netfinity Fibre Channel Short-Wave GBIC | | N/A | N/A | N/A |
| 2109S08 | SAN Fibre Channel Switch, 8-port | | Standard | N/A | 21P3342 |
| 09L5403 | SAN Switch Redundant Power Supply | | N/A | N/A | N/A |
| 2108R3L | SAN Data Gateway Router UltraSCSI LVD Port | | N/A | N/A | 21P3342 |
| 37L6889 | ServeRAID-4H Ultra160 SCSI Controller | | N/A | N/A | N/A |
| 06P3601 | 10/100 Ethernet Server Adapter | | N/A | N/A | N/A |
| 34L0701 | Token-Ring 16/4 PCI Adapter 2 with Wake on LAN | | N/A | N/A | N/A |
| 06P3701 | Gigabit Ethernet SX Server Adapter (fiber) | | | | |
| 31L3820 | Fast Ethernet on STP Adapter 2.5m Cable | Attachment from ethernet adapter to ethernet switch | N/A | N/A | N/A |
| 34L0301 | Netfinity Gigabit Ethernet SX Adapter | | N/A | N/A | N/A |
| 31L3820 | Fast Ethernet on STP Adapter 2.5m Cable | Attachment from ethernet adapter to ethernet switch | N/A | N/A | N/A |
| 930842S | NetBAY42 Enterprise Rack Cabinet (ER) | | 41L2762 | 41L2763 | 21P3341 |
| 930842E | NetBAY42 Enterprise Expansion Rack Cabinet (EX) | | 41L2762 | 41L2763 | 21P3341 |
| 94G7448 | Power Cable Type C12 (3.7m, 12ft) | Provides IEC 320-C13 (Device) to IEC 320-C14 (Power Unit) power cord | N/A | N/A | N/A |
| 37L6865 | NetBAY Server Dual Cord Power Distribution Unit | | N/A | N/A | N/A |
| 37L6866 | NetBAY Rack Power Distribution Unit | | N/A | N/A | N/A |
| 37L6883 | NetBAY Single Phase Front-End Power Distribution Unit with 120V line cord | | N/A | N/A | N/A |
| 37L6884 | NetBAY Single Phase Front-End Power Distribution Unit with 208V line cord | | N/A | N/A | N/A |
| 37L6886 | NetBAY Three Phase Front-End Power Distribution Unit with 208V line cord | | N/A | N/A | N/A |
| 37L6861 | APC Smart-UPS 5000RMB | | N/A | N/A | 21P3342 |
| 3502R14 | DLT Tape Library - Rack (includes SCSI Adapter) | | 41L2747 | N/A | 21P3342 |
| 06P3882[4] | Cisco CAT2912 12-port Ethernet Switch/Enterprise Edition | Used for interconnect of heartbeat | N/A | N/A | 21P3342 |
| 19K5788[4] | 25ft Ethernet Crossover Cable | Interconnects 2 nodes without an ethernet switch | N/A | N/A | N/A |
| 06P7495 | Option Install Fee | Quantity equals the number of options installed. | N/A | N/A | N/A |

1. This Service offering is not available in all countries and is limited to selected areas (see Fax #8146 on 1-800-IBM-4FAX).
All final customer configurations and solutions require IBM Solution Assurance Approval.
2. Memory from the Required Options table must be ordered. Additional hardware may also be required, such as an ethernet switch and cables.
3. Processor upgrade speed and cache must match the standard processor installed in each node.
4. There may be some variance in IBM part numbers outside of the US and Canada.

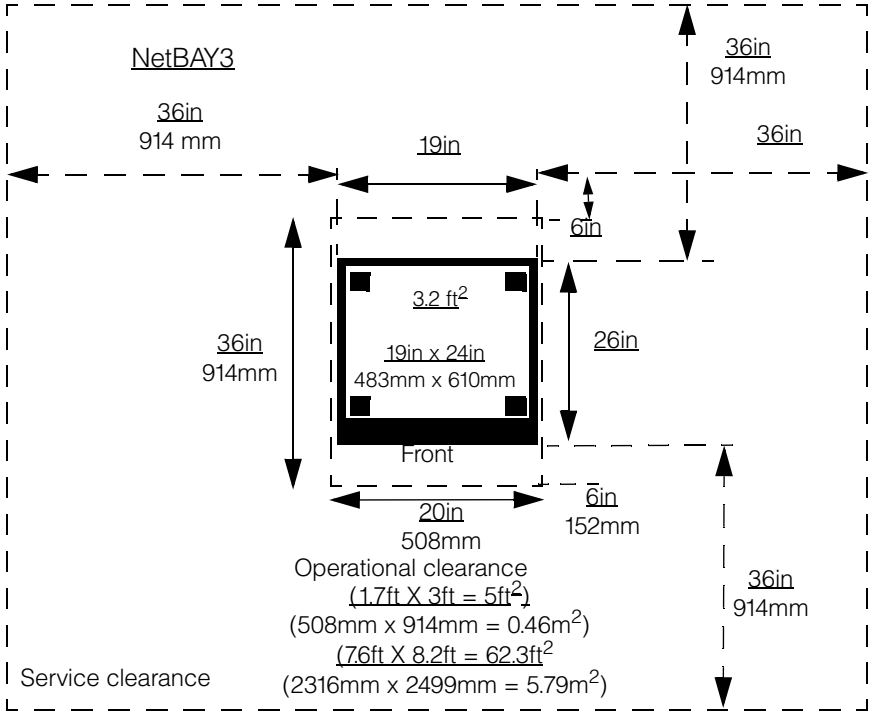
# IBM Netfinity NetBAY3/NetBAY3E™ Stackable Enclosures

Sample Configuration




Installation Guidelines:

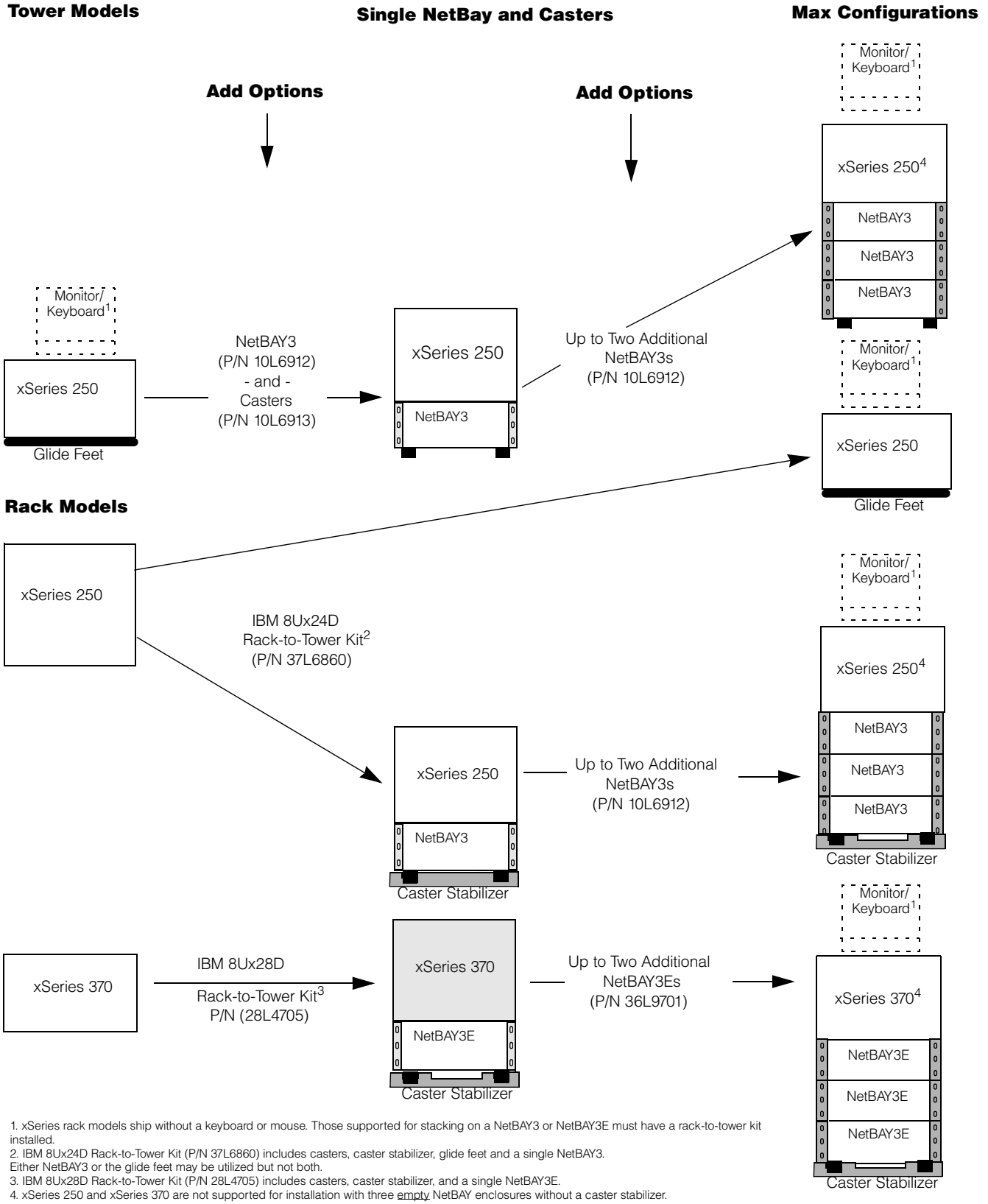
1) Locate power units with line cords in the bottom enclosure.
2) Install components starting from the bottom; start with the heaviest device.
3) If nothing is installed in the enclosure, attach the rear blank panel for stability.




| Supported Devices | NetBAY3 | NetBAY3E | Size (U) | Max/Enclosure | Max/Stack |
|---|---|---|---|---|---|
| **Servers** | | | | | |
| xSeries 250 | X | - | n/a | n/a | 1 |
| xSeries 370[1] | - | X | n/a | n/a | 1 |
| **Expansion[2]** | | | | | |
| Netfinity EXP300 | X | X | 3 | 1 | 3 |
| FAStT200 Storage Server | X | X | 3 | 1 | 1 |
| FAStT200 HA Storage Server | X | X | 3 | 1 | 1 |
| FAStT EXP500[3] | X | X | 3 | 1 | 2 |
| **Tape Units[2]** | | | | | |
| NetMEDIA 3551001 | X | X | 3 | 1 | 3 |
| **Power[2]** | | | | | |
| APC Smart-UPS 1400RMB | X | X | 3 | 1 | 1 |
| APC Smart-UPS 3000RMB | X | X | 3 | 1 | 1 |
| 100-120V PDU | X | X | 1 | 1 | 1 |
| NetBAY Server Dual Cord PDU | X | X | 1 | 1 | 1 |
| NetBAY Rack PDU | X | X | 1 | 2 | 2 |
| **Communications[2]** | | | | | |
| 8230 T-R Controlled Access Unit | X | X | 2 | 1 | 3 |
| 8235 Dial-in Access to LAN | X | X | 1 | 3 | 9 |
| 8285 ATM Switch | X | X | 3 | 1 | 3 |

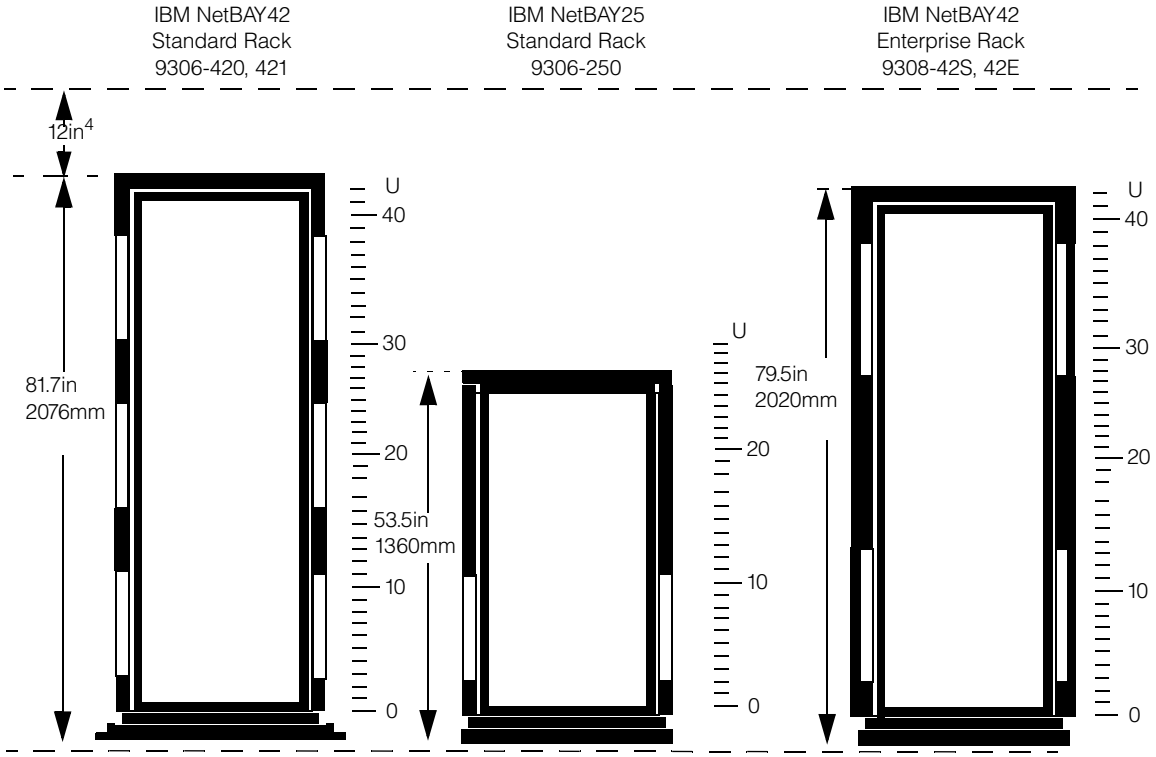
1. xSeries 370 systems are rack-mountable and ship without a keyboard. In order to be utilized with a NetBAY3 (or in any tower configuration), optional Rack-to-Tower Kit (P/N 28L4705) must be installed.
2. NetBAY3 and NetBAY3E do not contain a top cover and require a supported server as the top component in a stack.
3. FAStT EXP500 requires a FAStT200 or FAStT200 HA Storage Server in a NetBAY3 or NetBAY3E configuration.

# IBM Netfinity NetBAY3/3E Stackable Enclosure




1. xSeries rack models ship without a keyboard or mouse. Those supported for stacking on a NetBAY3 or NetBAY3E must have a rack-to-tower kit installed.
2. IBM 8Ux24D Rack-to-Tower Kit (P/N 37L6860) includes casters, caster stabilizer, glide feet and a single NetBAY3. Either NetBAY3 or the glide feet may be utilized but not both.
3. IBM 8Ux28D Rack-to-Tower Kit (P/N 28L4705) includes casters, caster stabilizer, and a single NetBAY3E.
4. xSeries 250 and xSeries 370 are not supported for installation with three empty NetBAY enclosures without a caster stabilizer.

# Rack Cabinets and Options




| | IBM NetBAY42 Standard Rack | | IBM NetBAY25 Standard Rack[3] | IBM NetBAY42 Enterprise Rack | |
|---|---|---|---|---|---|
| **Machine Type / Model** | 9306420 | 9306421 | 9306250 | 930842S | 930842E |
| EIA Capacity[1] | 42U | 42U | 25U | 42U | 42U |
| Sidewall Compartments | 6 | 6 | 2 | 4 | 4 |
| Front Stabilizers | Std | Std | Std | Std | Std |
| Side Stabilizers | Std | Std | NR | NR | NR |
| Casters | Std | Std | Std | Std | Std |
| Leveling Feet | Std | Std | Std | Std | Std |
| Side Covers | Std | NR | Std | Std | NR |
| Glass Front Door | NA | NA | NA | NA | NA |
| Perforated Front Door | Std | Std | Std | Std | Std |
| Empty Weight (kg/lb) | 117 / 258 | 92 / 202 | 80 / 177 | 261 / 575 | 234 / 516 |
| Max Load (kg/lb) | 646 / 1424 | 646 / 1424 | 385 / 849 | 667 / 1470 | 667 / 1470 |
| Total Weight (kg/lb) | 763 / 1682 | 738 / 1626 | 465 / 1026 | 928 / 2045 | 901 / 1986 |
| Rack Attachment Kit[2] | NR | Std | NA | NR | Std |

NR - Not Required NA - Not Available 1U=1.75in (44.5mm)

1. Conforms to EIA 310 - D Standard 19in rack specification for a Type A cabinet with universal hole spacing.
2. Required to attach racks together to make a suite.
3. Display and keyboard may be placed on top of the NetBAY25.
4. Minimum clearance to the ceiling.

| | Server System Rack and Stack Alternatives | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Conversion Kits | | | | | | Stacks | | Standard Racks[1] | | | Enterprise Racks[1] | |
| | 09N4300 4Ux20D Tower-to-Rack Kit | 37L6858 5Ux24D Tower-to-Rack Kit | 21P3513 5Ux24D Tower-to-Rack Kit II | 37L6859 8Ux24D Tower-to-Rack Kit | 37L6860 8Ux24D Rack-to-Tower Kit[2] | 28L4705 8Ux28D Rack-to-Tower Kit[3] | 10L6912 NetBAY3 Stackable Enclosure | 36L9701 NetBAY3E Stackable Enclosure | 9306-250 NetBAY25SR | 9306-420 NetBAY42SR | 9306-421 NetBAY 42SX | 9308-42S NetBAY42ER | 9308-42E NetBAY42EX |
| **Servers** | | | | | | | | | | | | | |
| xSeries 200[4] | X | | | | | | | | X | X | X | X | X |
| xSeries 220[4] | X | | | | | | | | X | X | X | X | X |
| xSeries 230 | | X | | | | | | | X | X | X | X | X |
| xSeries 232 | | | X | | | | | | X | X | X | X | X |
| xSeries 240 | | X | | | | | | | X | X | X | X | X |
| xSeries 250 | | | | X | X | | X[5] | | X | X | X | X | X |
| xSeries 300[6] | | | | | | | | X[7] | X | X | X | X | X |
| xSeries 330[6] | | | | | | | | X[7] | X | X | X | X | X |
| xSeries 340 | | | | | | | | | X | X | X | X | X |
| xSeries 342 | | | | | | | | | X | X | X | X | X |
| xSeries 350 | | | | | | | | | X | X | X | X | X |
| xSeries 370[8] | | | | | | X | | X[5] | X | X | X | X | X |
| xSeries 380 | | | | | | | | | X | X | X | X | X |
| Netfinity 4500R | | | | | | | | | X | X | X | X | X |
| Netfinity 5100 | | X | | | | | | | X | X | X | X | X |
| Netfinity 5600 | | X | | | | | | | X | X | X | X | X |

1. See the first page of Rack Cabinets and Options section for additional information concerning IBM rack-supported devices.
2. Includes one NetBAY3 stackable enclosure with casters. See IBM NetBAY3/NetBAY3E Stackable Enclosures section for supported devices.
3. Includes one NetBAY3E stackable enclosure with casters. See IBM NetBAY3/NetBAY3E Stackable Enclosures section for supported devices.
4. Rack installation requires appropriate Conversion Kit.
5. A maximum of three NetBAY3 or NetBAY3E enclosures may be stacked beneath a supported system unit. NetBAY3 and NetBAY3E enclosures are shipped separately and not while attached to the server system unit.
6. Blank filler panels (P/N 94G6670) should be placed on the front of any unused rack space to aid proper airflow through the x300 and x330 system units. If non-IBM racks are used, assure that both the front and rear doors offer a minimum of 45% open area uniformly distributed and in line with the installed servers. A clearance of at least 51mm (2in) must be maintained between the front door and the system unit's front bezel. The rear door must maintain the same or greater clearance. Nonrack or NetBAY3 installations are not supported.
7. Up to three xSeries 300s or 330s may be installed inside a NetBAY3E stackable enclosure when a supported server is installed at the top of the enclosure.
8. Stand-alone tower installation requires appropriate Conversion Kit.

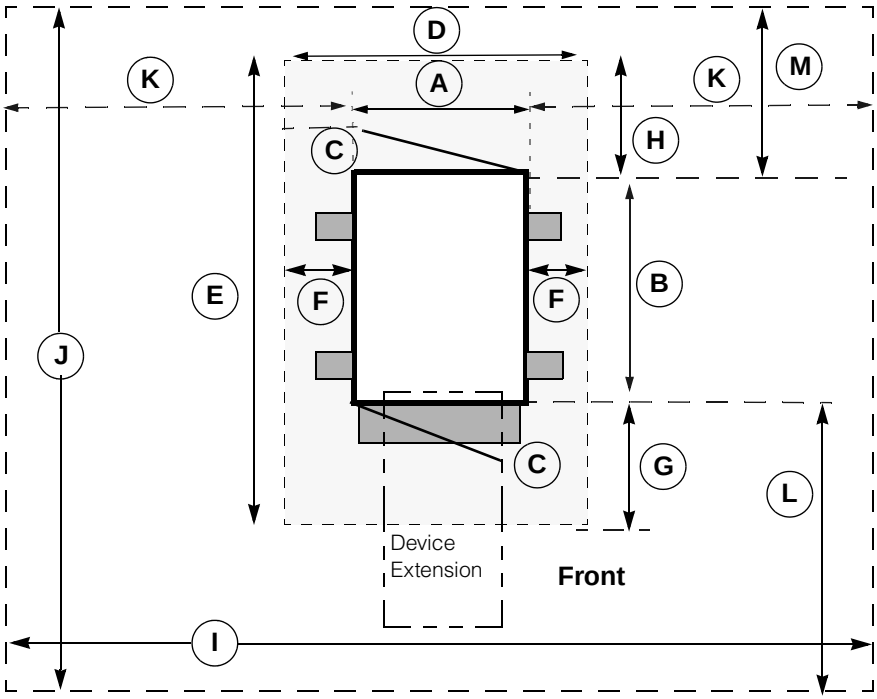
| IBM Rack Mounted Units | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Standard Power Cords[7] | | | | | | |
| **Description** | **Machine Type / Model** | **Size (U)[4]** | **Approx Weight (lbs)** | **Power (Watts) Typical/Max (All cords to same source)** | **Number of P/S and Line Cords Typical/Max** | **6ft NEMA 5-15P P/N 6952301** | **9ft NEMA 5-15P P/N 6952300** | **14ft NEMA 5-15P P/N 13F9961** | **9ft NEMA 6-15P P/N 1838574** | **9ft IEC 320-C14 P/N 36L8886** | **14ft IEC 320-C14 P/N 36L8861** | **8ft IEC 320-C20 P/N00N7701** |
| **Server System Units** | | | | | | | | | | | | |
| x200[1] | 8478 | 4 | 42 | 245/350 | 1/1 | 1 | | | | | | |
| x220[1] | 8645 | 4 | 42 | 245/350 | 1/1 | 1 | | | | | | |
| x230/5100 | 8658 | 5 | 79 | 250/357 | 1/1 | 1 | | | | | | |
| x230/5100 w/Pwr Upgrade[5] | 8658 | 5 | 79 | 315/450 | 1/3[5] | 1 | | | | | | |
| x232 | 8668 | 5 | 76 | 385/550 | 1/1[6] | 1 | | | | | | |
| x232 w/Pwr Conversion[6] | 8668 | 5 | 80 | 420/600 | 2/3[6] | 2/3 | | | | | | |
| x240/5600 | 8664 | 5 | 80 | 315/450 | 2/3 | 2 | | | | | | |
| x250 | 8665 | 8 | 123 | 350/475 | 2/4 | | 2 | | | | | |
| x300[2] | 8672 | 1 | 29 | 140/200 | 1/1 | | 1 | | | 1 | | |
| x330[2] | 8654/8674 | 1 | 29 | 140/200 | 1/1 | | 1 | | | 1 | | |
| x340/4500R | 8656 | 3 | 61 | 270/415 | 1/2 | | 1 | | | 1 | | |
| x342 | 8669 | 3 | 62 | 262/375 | 1/2 | | 1 | | | 1 | | |
| x350 | 8682 | 4 | 76 | 365/525 | 1/3 | | 1 | | | 1 | | |
| x370[3] | 8681 | 8 | 160 | 1015/1450 | 3/3 | | 3 | | 3 | 3 | | |
| x380 | 8683 | 7 | 150 | 1400/2000 | 2/2 | | | | | | | 2 |
| **Storage Units** | | | | | | | | | | | | |
| EXP300 | 35311RU | 3 | 90 | 285/360 | 2/2 | | 2 | | | | | |
| FAStT200 | 35421RU | 3 | 56 | 275/390 | 2/2 | | 2 | | | | | |
| FAStT200HA | 35422RU | 3 | 56 | 275/390 | 2/2 | | 2 | | | | | |
| FAStT500 RAID Controller | 35521RU | 4 | 76 | 140/200 | 2/2 | | 2 | | | | | |
| FAStT EXP500 Storage Unit | 35601RU | 3 | 61 | 245/350 | 2/2 | | 2 | | | | | |
| FC Switch 8-port | 2109S08 | 1 | 17 | -/200 | 1/2 | | 1 | | | | | |
| FC Switch 16-port | 2109S16 | 2 | 28 | -/200 | 1/2 | | 1 | | | | | |
| **Tape Units** | | | | | | | | | | | | |
| NetMEDIA | 3551001 | 3 | 37 | 130/185 | 2/2 | 2 | | | | | | |
| DLT Library | 3502R14 | 4 | 70 | -/135 | 1/1 | 1 | | | | | | |
| Magstar 1 drive | 3570C21 | 6 | 64 | 140/200 | 1/1 | | | 1 | | | 1 | |
| Magstar 2 drives | 3570C22 | 6 | 64 | 140/200 | 2/2 | | | 2 | | | 2 | |

1. Requires 4Ux20D Tower-to-Rack Kit (P/N 09N4300) to mount server unit into an EIA rack cabinet.
2. To provide adequate cooling, blank filler panel kit (P/N 94G6670) should be placed on the front of any unused rack space. If non-IBM racks are to be used, assure that both front and rear doors offer a minimum of 48% open area uniformly distributed and in line with installed servers. A clearance of 51 to 64mm (2 to 2.5in) must be maintained between the front of the door and the system unit's front bezel. The rear door must maintain the same or greater clearance. Nonrack or NetBAY3 installations are not supported.
3. x370 requires installation of extension kit (P/N 36L9703 or 36L9702) when installed in a 9306-900, 910 or 9306-200, respectively, for proper rear door clearance.
4. 1U = 1.75in (44.45mm).
5. One power supply standard; the Hot-Swap Power Supply Upgrade Kit (P/N 37L6881) allows one to three hot swap power supplies.
6. One 385W power supply standard on base models, two 250W power supplies on redundant models. xSeries Hot-Swap Power Conversion Kit (P/N 24P3513) supports one to three hot-swap power supplies. Base models require removing the standard power supply and adding the conversion kit with 250W power supply. Redundant models do not require adding the conversion kit.
7. Optional rack power cords: P/N 94G6667 - 14ft NEMA 5-15P; P/N 94G7448 - 14ft IEC 320-C14.

General rack placement rules and other information:
- Locate heaviest components at the bottom of the rack (i.e., UPS, then servers or storage, etc.).
- Do not extend more than one component on side rails at a time.
- Maximum of three UPSs (including no more than two APC 5000 UPSs) per rack.
- Utilize sidewall compartments for mounting PDUs and console switches prior to using EIA space.
- When mounting components in a rack, consider user and service requirements.
- When selecting length of power, console and storage cables, consider extension of cable management arms and overall cable routing.
- BTUs = Watts x 3.41.

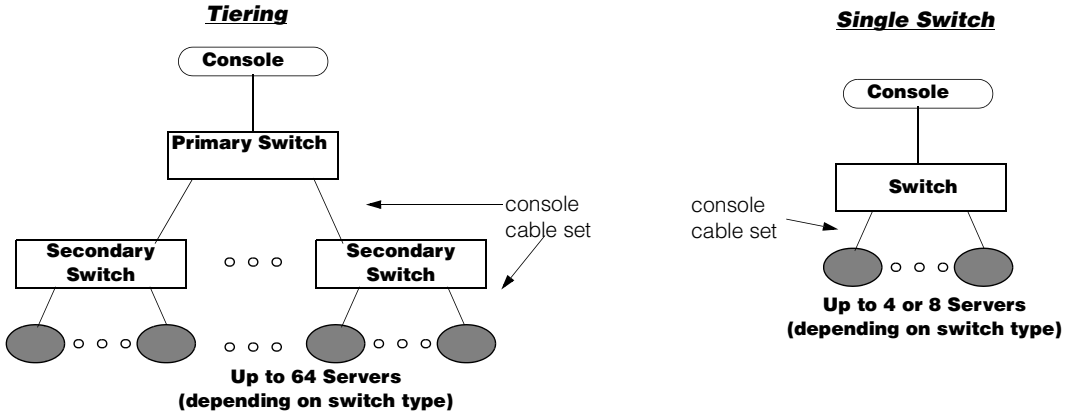
| Power Supply Options | | | | | | |
|---|---|---|---|---|---|---|
| | | | Standard Power Cords | | | |
| Power Supply | Part Number | Usable with | 6ft NEMA 5-15P P/N 6952301 | 9ft NEMA 5-15P P/N 6952300 | 6ft NEMA 6-15P P/N 1838576 | 9ft IEC 320-C14 P/N 36L8886 |
| 110W | 09L5403 | 2109 | | 1 | | |
| 250W | 33L3760 | x230, 5100, x232. x240, 5600, x250 | 1 | | | |
| 270W | 37L6880 | x340, 4500R, x342, x350 | | 1 | | 1 |

| Rack Options | | |
|---|---|---|
| Part Number | Description | Information |
| 28L4707 | Netfinity Rack Keyboard Tray | Supports Keyboards in racks, also used with Flat Panel Monitor Rack Mount Kit II |
| 01K1260 | TrackPoint IV 104-key Black Keyboard | 1U, includes TrackPoint IV, requires Rack Keyboard Tray (P/N 28L4707) |
| 28L3644 | Space Saver II Keyboard | 1U, includes TrackPoint IV, requires Rack Keyboard Tray (P/N 28L4707) |
| 94G7444 | Monitor Compartment | |
| 633347N | E51 Color Monitor | 9U, requires Monitor Compartment (P/N 94G7444) |
| 6331N2N | E54 Color Monitor | 9U, requires Monitor Compartment (P/N 94G7444) |
| 6332J1N | E74 Color Monitor | 10U, requires Monitor Compartment (P/N 94G7444) |
| 37L6888 | Flat Panel Monitor Rack Mount Kit II | Requires Rack Keyboard Tray (P/N 28L4707) |
| 9511AG4 | T540 Flat Panel Color Monitor 15in | 3U, requires Flat Panel Monitor Rack Mount Kit II (P/N 37L6888) |
| 09N4290 | NetBAY 1 x 4 Console Switch | 1U, mounts in sidewall compartments, EIA space or Monitor Compartment; supports one to four servers, one console |
| 09N4291 | NetBAY 2 x 8 Console Switch | 1U, mounts in sidewall compartments, EIA space or Monitor Compartment; supports one to eight servers, two consoles (only one console when installed in the Monitor Compartment) |
| 09N4293 | Console Cable Set - 7ft | Connects servers to console switch |
| 94G7447 | Console Cable Set - 12ft | Connects servers to console switch |
| 94G6666 | 100-120V Power Distribution Unit | 1U, 100-120V, 12A, mounts in sidewall compartment or EIA space, eight NEMA 5-15R outlets, requires one L5-15R wall receptacle |
| 37L6866 | NetBAY Rack PDU (US) | 1U, 100-240V, 15A, mounts in sidewall compartment or EIA space, seven IEC 320-C13 outlets, requires one NEMA L5-20R or L6-20R wall receptacle |
| 37L6865 | NetBAY Server Dual-cord PDU (US) | 1U, 100-240V, 15/10A, mounts in sidewall compartment or EIA space, four IEC 320-C13 outlets, requires two NEMA L5-20R or L6-20R wall receptacles |
| 37L6883 | NetBAY 100-127V Single-phase Front-end PDU (US) | 1U, 100-127V, shared 30A, mounts in sidewall compartment, three IEC 320-C19 outlets, requires one NEMA L5-30R wall receptacle |
| 37L6884 | NetBAY 200-240V Single-phase Front-end PDU(US) | 1U, 200-240V, shared 20A, mounts in sidewall compartment, three IEC 320-C19 outlets, requires one NEMA L6-30R wall receptacle |
| 37L6886 | NetBAY 3-phase Front-end PDU (US) | 1U, 380-415V, shared 30A, mounts in sidewall compartment, three IEC 320-C19 outlets, requires one NEMA L21-30R wall receptacle |
| 94G6674 | APC Smart-UPS 1400RMB | 3U, 120V, 10A, six NEMA 5-15R outlets, requires one NEMA L5-15R wall receptacle |
| 94G6676 | APC Smart-UPS 3000RMB | 3U, 120V, 23A, eight NEMA 5-15R outlets, requires one NEMA L5-30R wall receptacle |
| 37L6861 | APC Smart-UPS 5000RMB | 5U, 208V, 22A, eight IEC 320-C13 outlets, two IEC 320-C19 outlets, reqires one NEMA L6-30R wall receptacle; ships standard with two IEC 320-C19 to C20 cables to support PDUs. |
| 94G7446 | Rack Attachment Kit | Used to attach 9306-900, 910 racks to make a suite |
| 94G6670 | Blank Filler Panel Kit | Consists of one 5U, one 3U, and two 1U blank filler panels |
| 94G7442 | Fixed Shelf | Supports up to 100lbs |
| 94G6667 | Rack Power Cord -Type A14 | IEC 320-C13 to NEMA 5-15P (14ft) |
| 94G7448 | Rack Power Cord -Type C12 | IEC 320-C13 to IEC 320-C14 (14ft) |

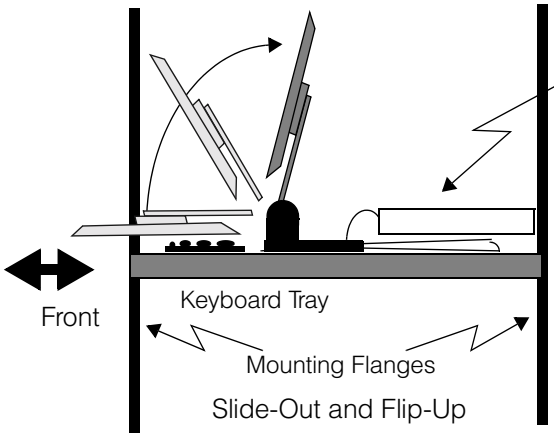



| | 9306-xxx (inches) | 9308-xxx (inches) | Description |
|---|---|---|---|
| **Box Footprint** | | | |
| A | 23.6 | 25.5 | Width of rack |
| B | 39.4 | 43.5 | Depth of rack (not including front stabilizer) |
| C | 24 | 26 | Front and rear door clearance |
| **Operational Clearance** | | | |
| D | 27.6 | 29.5 | Width of Operational Clearance area |
| E | 93.4 | 110 | Depth of Operational Clearance area |
| F | 2 | 2 | Left/Right sides of rack to Operational Clearance area |
| G | 30 | 36 | Front of rack to Operational Clearance area |
| H | 24 | 26 | Rear of rack to Operational Clearance area |
| **Service Clearance** | | | |
| I | 95.6 | 97.5 | Width of Service Clearance area |
| J | 129.4 | 133.5 | Depth of Service Clearance area |
| K | 36 | 36 | Left/Right sides of rack to Service Clearance area |
| L | 60 | 60 | Front of rack to Service Clearance area |
| M | 30 | 30 | Rear of rack to Service Clearance area |

## Switch Arrangements




Keyboard/Pointer/Monitor & Switch … all in 3U



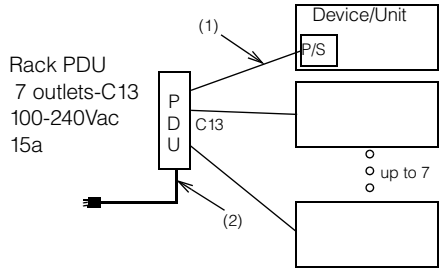

Console Switch
- Mounts to rear flanges
- Shares 3U space with display, keyboard and tray

Keyboard Tray Components
- 28L4707 Netfinity Rack Keyboard Tray
- 37L6888 Netfinity Flat Panel Monitor Rack Mount Kit II
- 28L3644 Space Saver Keyboard
- 9511AG1 T54A TFT Color Monitor

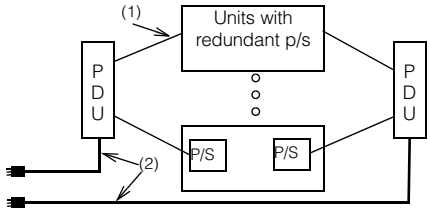
# NetBAY Rack Power Configurator

## Possible Power Configurations:

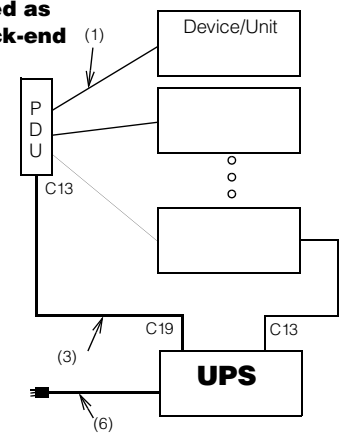
### Single Rack PDU



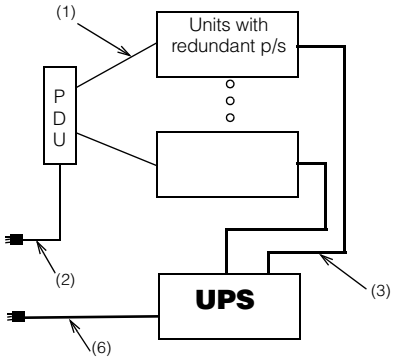

### Redundant Power Distribution



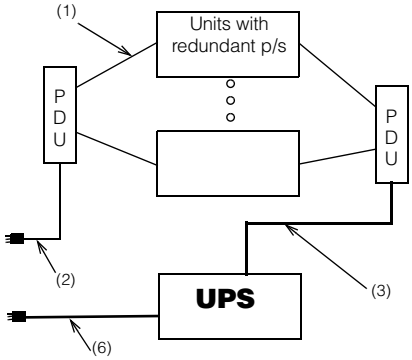

### PDU used as UPS back-end




### Redundant Power Distribution with PDU and UPS



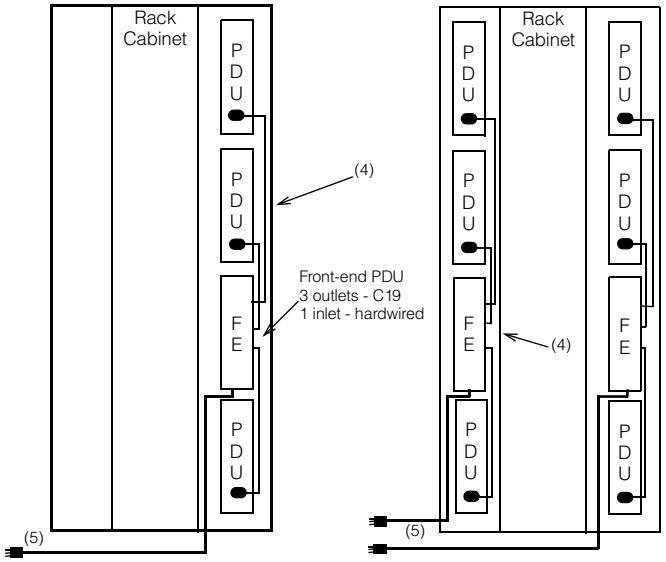

### Redundant Power Distribution with PDU and UPS with PDU




## Typical Rack Power Configurations:

**Simple --** three Rack PDUs and one Front-end PDU (single circuit, 21 outlets)

**Redundant --** six Rack PDUs and two Front-end PDUs (dual circuit, 42 outlets)




### Rack Rules:

Total PDUs (LV PDUs, HV PDUs, Rack PDUs, Server PDUs, FE PDUs) = 8
Total Server PDUs = 3
Total Front-end PDUs = 2

### Outlets:

| Outlets | C19 | C13 |
|---|---|---|
| Rack PDU | 0 | 7 |
| Server PDU | 0 | 4 |
| Front-end PDU | 3 | 0 |

NOTES:
1. Each device/unit usually comes with a power cord. The PDU requires the power cord to have an IEC 320-C14 plug. Order P/N 94G7448 (14ft) if appropriate cord is not provided by the device/unit.
2. Each PDU and UPS comes with a country-specific power cord.
3. Internal rack power cable provided with APC SmartUPS 5000 UPS.
4. Internal rack power cable provided with Front-end PDU.
5. Line cord provided with Front-end PDU.
6. UPS comes with a country-specific power cord or a terminal block.
7. Customer responsible to provide a dedicated circuit for each line cord protected with an appropriate circuit breaker.
8. P/S = Power Supply.

| | US models | | | EMEA models | |
|---|---|---|---|---|---|
| Outlets | C19 | C13 | NEMA | C19 | C13 |
| APC 1400RMB | 0 | 0 | 6 | 0 | 4 |
| APC 3000RMB | 0 | 0 | 8 | 1 | 8 |
| APC 5000RMB | 2 | 8 | 0 | 2 | 8 |

# Country Specific Considerations -- USA, Canada, parts of Latin America, Taiwan

**Power Cables:**

**1. Device to Rack PDU power cable**
IEC C13 to C14, 10/15a cable
typical: P/N 36L8886 (2.8m)
requirement: C14 plug, long enough to reach
available option: 94G7448 (14ft)

**2. Rack PDU to wall line cord** → (2) Line Cords: Rack PDU
IEC C19 to country-specific connector,
16/20a, 14ft (4.3m)

**3. Rack PDU to UPS power cable**
IEC C19 to C20, 16/20a
P/N 00N7700 (2m)
provided with P/N 37L6861 (APC SU-5000RMB)

**4. Rack PDU to Front-end PDU power cable**
IEC C19 to C20, 16/20a
P/N 00N7698 (1m)
provided with the Front-end PDUs

**5. FE PDU to wall line cord** → (2) Line Cords: Type W PDU
special to country-specific connector, 30a,
8.2ft (2.5m)

| Part Number | Plug Type | Source Circuit (single phase 50/60Hz) | PDU Output (single phase 50/60Hz) |
|---|---|---|---|
| 37L6866 | NEMA L5-20P | 100-127Vac, 20a | seven 100-127Vac, shared 15a |
| | NEMA L6-20P | 200-240Vac, 20a | seven 200-240Vac, shared 15a |

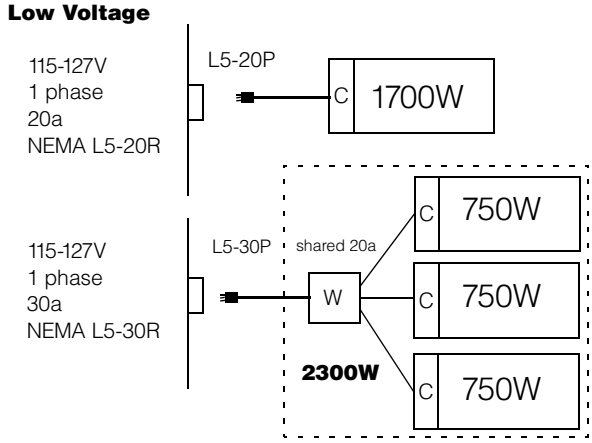
| Part Number | Plug Type | Source Circuit (50/60Hz) | PDU Output (single phase 50/60Hz) |
|---|---|---|---|
| 37L6883 | NEMA L5-30P | 100-127Vac, 30a, single-phase | three 100-127Vac, 20a each, shared 30a |
| 37L6884 | NEMA L6-30P | 200-240Vac, 30a, single phase line-to-line with ground | three 200-240Vac, shared 20a |
| 37L6886 | NEMA L21-30P | 200-250Vac, 30a, three-phase Y-connection with neutral | three 100-127Vac (115-145), 20a each |

## Power Load Capacity -- xSeries / Netfinity Rack Systems

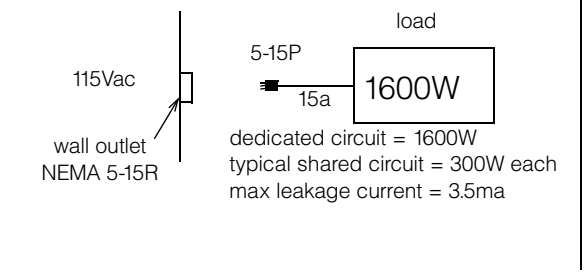
NOTE:

C: = Rack PDU has a 15a circuit breaker
W = FE PDU has a 20a fuse
dedicated circuit
leakage current > 3.5ma

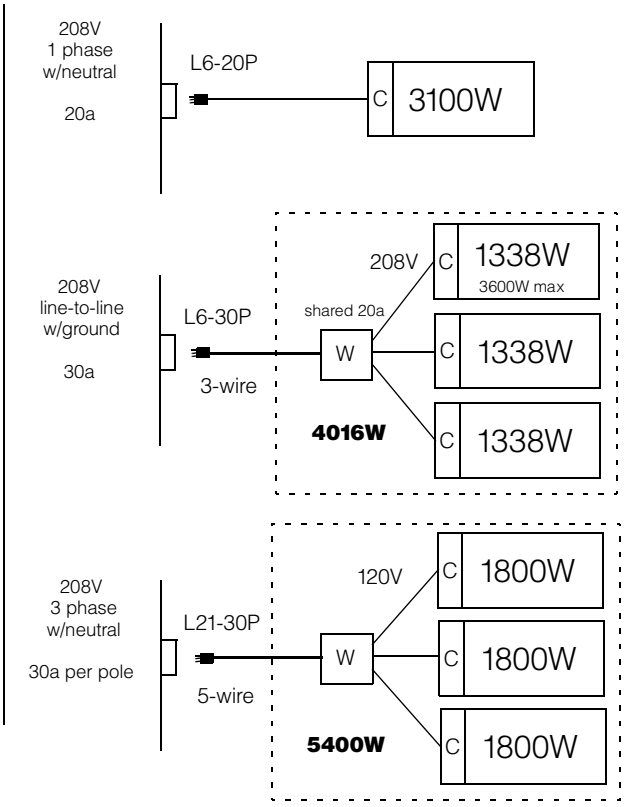
### Low Voltage




### Typical Office




### High Voltage



# Country Specific Considerations -- Europe, Mid-East, Africa, Asia Pacific, parts of Latin America

**Power Cables:**

**1. Device to Rack PDU power cable**
IEC C13 to C14, 10/15a cable
typical: P/N 36L8886 (2.8m)
requirement: C14 plug, long enough to reach
available option: 94G7448 (14ft)

**2. Rack PDU to wall line cord**
IEC C19 to country-specific connector,
16/20a, 14ft (4.3m)

**3. Rack PDU to UPS power cable**
IEC C19 to C20, 16/20a
P/N 00N7700 (2m)
provided with P/N 37L6861 (APC SU-5000RMB)

**4. Rack PDU to Front-end PDU power cable**
IEC C19 to C20, 16/20a
P/N 00N7698 (1m)
provided with the Front-end PDUs

**5. Front-end PDU to wall line cord**
special to country-specific connector,
30/32a, 8.2ft (2.5m)

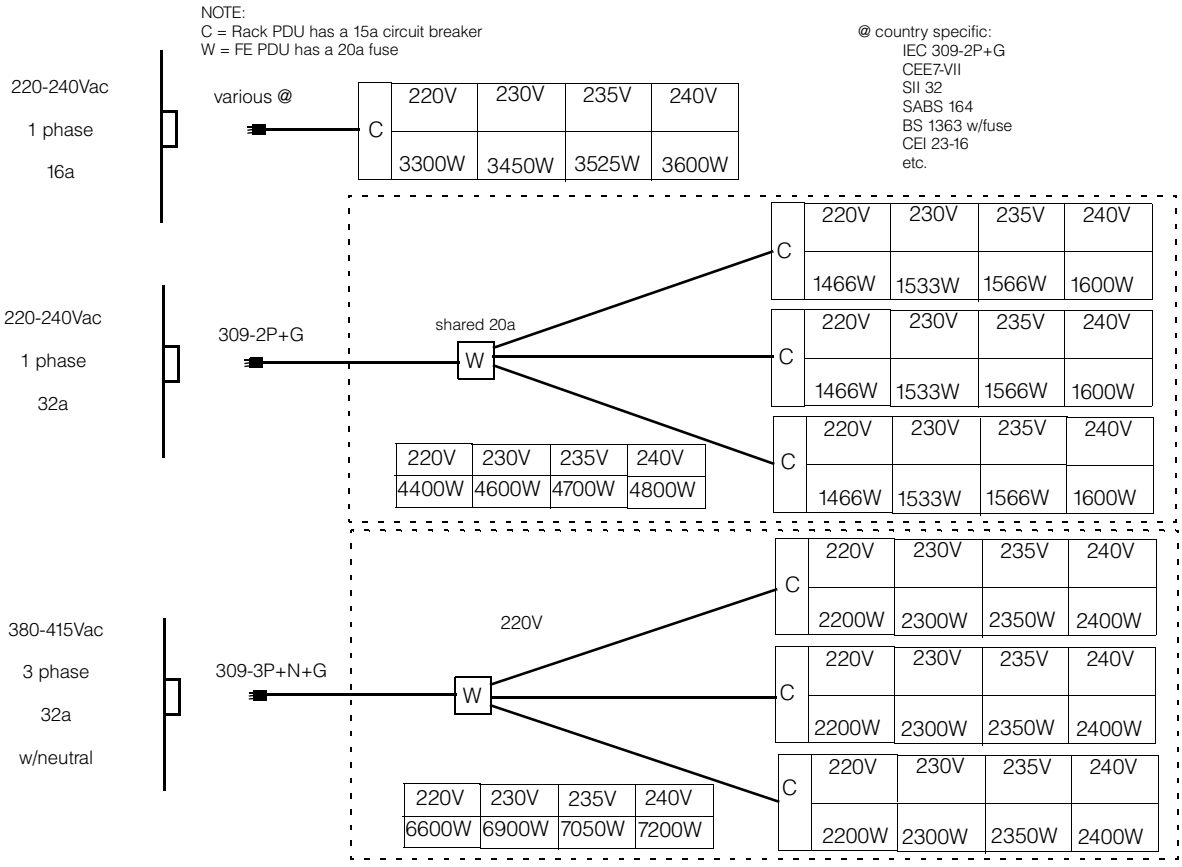
(2) Line Cords: Rack PDUs

| Part Number | Plug Type | Source Circuit (single phase 50/60Hz) | PDU Output (single phase 50/60Hz) |
|---|---|---|---|
| 37L6866 | NEMA L5-20P | 100-127Vac, 20a | seven 100-127Vac, shared 15a |
| | NEMA L6-20P | 200-240Vac, 20a | seven 200-240Vac, shared 15a |
| 37L6868 | CEE7-VII | 220-240Vac, 16a | |
| 37L6870 | IEC 309-2P+Gnd | 220-240Vac, 16a | |
| 37L6872 | SII 32 | 220-240Vac, 16a | |
| 37L6874 | CEI 23-16 | 220-240Vac, 16a | |
| 37L6876 | SABS 164 | 220-240Vac, 16a | |
| 06P6028 | BS 1363/A | 220-240Vac, 13a | |
| 37L6864 | country-specific line cord provided by IBM | country specific | country specific |

(5) Line Cords: Front-end PDUs

| Part Number | Plug Type | Source Circuit (50/60Hz) | PDU Output (single phase 50/60Hz) |
|---|---|---|---|
| 37L6883 | NEMA L5-30P | 100-127Vac, 30a, single-phase | three 100-127Vac, 20a each, shared 30a |
| 37L6884 | NEMA L6-30P | 200-240Vac, 30a, single phase line-to-line with ground | three 200-240Vac, shared 20a |
| 37L6886 | NEMA L21-30P | 200-250Vac, 30a, three-phase Y-connection with neutral | three 100-127Vac (115-145), 20a each |
| 37L6885 | IEC 309-2P+Gnd | 220-240Vac, 32a, single-phase | three 220-240Vac, 16a each, shared 32a |
| 37L6887 | IEC 309-3P+N+Gnd | 380-415Vac, 32a, three-phase Y-connection with neutral | three 220-240Vac, 16a each |

## Power Load Capacity -- xSeries / Netfinity Rack Systems



# Country Specific Considerations -- Japan

**Power Cables:**

**1. Device to Rack PDU power cable**
IEC C13 to C14, 10/15a cable
typical: P/N 36L8886 (2.8m)
requirement: C14 plug, long enough to reach
available option: 94G7448 (14ft)

**2. Rack PDU to wall line cord**
IEC C19 to country-specific connector,
16/20a, 14ft (4.3m)

**3. Rack PDU to UPS power cable**
IEC C19 to C20, 16/20a
P/N 00N7700 (2m)
provided with P/N 37L6861 (APC SU-5000RMB)

**4. Rack PDU to Front-end PDU power cable**
IEC C19 to C20, 16/20a
P/N 00N7698 (1m)
provided with the Front-end PDUs

**5. Front-end PDU to wall line cord**
special to country-specific connector, 30/32a,
8.2ft (2.5m)

(2) Line Cords: Rack PDUs

| Part Number | Plug Type | Source Circuit (single phase 50/60Hz) | PDU Output (single phase 50/60Hz) |
|---|---|---|---|
| 37L6866 | NEMA L5-20P | 100Vac, 20a | seven 100Vac, shared 15a |
| | NEMA L6-20P | 200Vac, 20a | seven 200Vac, shared 15a |

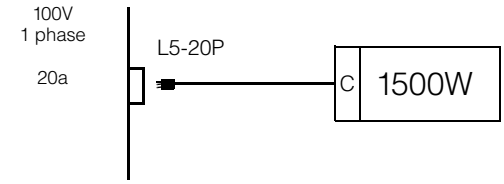
(5) Line Cords: Front-end PDUs

| Part Number | Plug Type | Source Circuit (50/60Hz) | PDU Output (single phase 50/60Hz) |
|---|---|---|---|
| 37L6883 | NEMA L5-30P | 100-127Vac, 30a, single-phase | three 100-127Vac, 20a each, shared 30a |
| 37L6884 | NEMA L6-30P | 200-240Vac, 30a, single phase line-to-line with ground | three 200-240Vac, shared 20a |
| 37L6886 | NEMA L21-30P | 200-250Vac, 30a, three-phase Y-connection with neutral | three 100-127Vac (115-145), 20a each |
| 37L6885 | IEC 309-2P+Gnd | 220-240Vac, 32a, single-phase | three 220-240Vac, 16a each, shared 32a |
| 37L6887 | IEC 309-3P+N+Gnd | 380-415Vac, 32a, three-phase Y-connection with neutral | three 220-240Vac, 16a each |

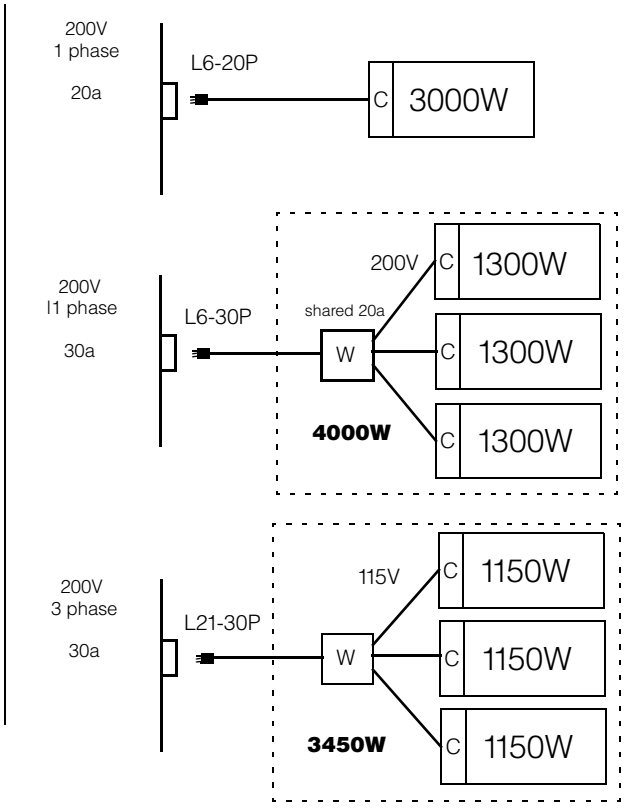
# Power Load Capacity -- xSeries / Netfinity Rack Systems

NOTE:
C = Rack PDU has a 15a circuit breaker
W = FE PDU has a 20a fuse

**Low Voltage**




**High Voltage**



# Appendix A: Tape Drive Attributes

LEGEND:

HH: Half-High - approx height of 1.6in
SL: Slim-Line - approx height of 1in
FH: Full-High

| Part Number | Description | SCSI Interface (bit) | Form Factor | Max GB-Native/Compr.[2] | MB/sec - Native/compr.[2] | Termination Incl | 68/50-pin Converter Incl | Internal Cables | Data/Cleaning Cartridges Included | Ext Tape Enclosures[1] |
|---|---|---|---|---|---|---|---|---|---|---|
| | **Tape Drives** | | | | | | | | | |
| 20L0549 | 10/20GB TR5 Internal IDE Tape Drive | - | 89mm (3.5in) SL or 133mm (5.25in) HH | 10/20 | 1/2 | - | - | - | 1/0 | - |
| 09N4041 | 12/24GB DDS/3 4mm Internal SCSI Tape Drive | 8 | 89mm (3.5in) HH or 133mm (5.25in) HH | 12/24 | 1.1/2.2 | Y | Y | - | 1/1 | 3510020, 3551001 |
| 00N7991 | 20/40GB DDS/4 4mm Internal Tape Drive | 16 Ultra2 LVD | 89mm (3.5in) HH or 133mm (5.25in) HH | 20/40 | 2.75/5.5 | N | - | - | 1/1 | 3510020[4], 3551001[3] |
| 09N4042 | 10/20GB NS Internal SCSI Tape Drive | 8 | 89mm (3.5in) SL or 133mm (5.25in) HH | 10/20 | 1/2 | Y | Y | - | 1/0 | 3510020, 3551001 |
| 09N4040 | 20/40GB DLT Internal SCSI Tape Drive | 8 | 133mm (5.25in) FH | 20/40 | 1.5/3 | N | Y | - | 1/1 | 3503BOX[4], 3551001 |
| 00N7990 | 40/80GB DLT Internal SCSI Tape Drive | 16 Ultra2 LVD | 133mm (5.25in) FH | 40/80 | 6/10 | N | - | - | 1/1 | 3503B0X[4], 3551001[3] |
| 00N8017 | 60/120GB 8mm M2 SCSI Tape Drive | 16 Ultra2 LVD | 133mm (5.25in) HH | 60/120 | 12/24 | N | - | - | 1[13] | 3551001[3] 3510020[4] |
| 00N8016 | 100/200GB LTO Tape Drive | 16 Ultra2 LVD | 133mm (5.25in) FH | 100/200 | 15/30 | N | - | - | 1/1 | 3551001[3] |
| 24P2396 | 100/200GB LTO Half-High Tape Drive | 16 Ultra2 LVD | 133mm (5.25in) HH | 100/200 | 8/16 | N | - | - | 1/1 | 3551001[3] |
| 00N8015 | 110/220GB Super DLT Internal SCSI Tape Drive | 16 Ultra2 LVD | 133mm (5.25in) FH | 110/220 | 11/22 | N | - | - | 1/1 | 3551001[3] |
| 24P2398 | 40/80GB Half-High DLTVS Internal SCSI Tape Drive | 16 Ultra2 LVD | 133mm (5.25in) HH | 40/80 | 3/6 | N | - | - | 1/1 | 3551001[3] |
| | **Associated Options** | | | | | | | | | |
| 00N7956 | 68-pin External Multimode LVD/SE SCSI Terminator | 16 LVD/SE | Ext | - | - | Y | N | - | - | 3510020, 3503B0X |
| 36L9636 | Netfinity Two-Drop Internal SCSI Cable[5] | 16 | Int | - | - | Y | N | 16-bit, 2-drop | - | - |
| 10K2340 | Media Bay Tray and LVD Cable Kit[6] | 16 LVD | Int | - | - | Y | N | 16-bit 2-drop | - | 3551001 |
| | **Tape Autoloaders** | | | | | | | | | |
| 3502108 | DLT Tape Autoloader | 16 | Desktop | 280/560 | 5/10 | Y | - | - | 1/1 | - |
| 00N7992 | 120/240GB DDS/4 Tape Autoloader | 16 Ultra2 LVD | 133mm (5.25in) FH | 120/240 | 3/6 | N | - | - | 5/1 | 3551001 |
| 3600109 | 3600 Series 900GB/1.8TB LTO Tape Autoloader[7] | 16 Ultra2 LVD | Tower or 6U Rack | 900/1.8TB | 15/30 | Y | - | - | 1/1 | |
| | **External Tape Enclosures** | | | | | | | | | |
| 3510020 | External Half High SCSI Storage Enclosure[8] | 8, 16 | Desktop | - | - | N | N | 8-bit or 16-bit | - | - |
| 3551001 | NetMEDIA Storage Expansion Unit EL[9] | 16 | Rack | - | - | Y | N | 2 x 16-bit, 4-drop | - | - |
| 10L7113 | NetMEDIA Systems Management Adapter[10] | 16 | - | - | - | N | N | - | - | 3551001 |
| 3503B0X | DLT External SCSI Enclosure[11] | 16 | Desktop | - | - | N | N | 16-bit | - | - |
| | **External Tape Libraries[12]** | | | | | | | | | |
| 3502x14 | DLT Tape Library | 16 | Desktop or Rack | 490/980 | 5/10 | Y | - | - | 1/1 | - |
| 3570C2x | Magstar MP 3570 Tape Subsystem | HVD | 6U Rack | 100/300 | 2.2/6 or 7/15 | Y | - | - | 1/1 | - |
| 3600xxx | 3600 Series LTO Tape Libraries and Expander Module | 16 Ultra2 LVD | Tower or Rack | 2TB/4TB | 15/30 | Y | - | - | 1/1 | - |

1. To determine cable requirements, note the tape drive's SCSI interface, the appropriate SCSI controller from the system configurator section and the desired enclosure then refer to Appendix D: Cables - Storage Units - Controllers. For installation of an internal tape drive into a server, see the appropriate system section.
2. Data compression typically provides a 2X improvement in capacity and transfer rate, but since data compression is affected by many factors, actual improvements may be more or less than 2X.
3. LVD support for LVD devices installed in a NetMEDIA Storage Expansion Unit EL (P/N 3551001) requires replacement of the standard single-ended internal cables with one or more (depending on configuration) cables from Media Bay Tray and LVD Cable Kit (P/N 10K2340) which contains a single two-drop multi-mode terminated cable. If the standard cables are used for attachment to LVD devices, single-ended SCSI rules and bus speeds apply.
4. Requires 68-pin External Multimode LVD/SE SCSI Terminator (P/N 00N7956).5.
5. Netfinity Two-Drop Internal SCSI Cable (P/N 36L9636) is a single-ended wide two-drop terminated cable.
6. Media Bay Tray and LVD Cable Kit (P/N 10K2340) includes an internal two-drop multi-mode terminated LVD SCSI cable.
7. If installed in a rack, a fixed shelf is required.
8. Black desktop 133mm (5.25in) half-high (HH) tape enclosure. Connector is configurable as 50-pin Centronix or 68-pin high density. Requires either tape drive self-termination or 68-pin External Multimode LVD/SE SCSI Terminator (P/N 00N7956).
9. NetMEDIA Storage Expansion Unit EL (P/N 3551001) is a black 3U, 19in rack or NetBAY3/3E mountable tape enclosure which includes two full high (FH) or four half-high (HH) extended length 5.25" bays, two external 0.8mm VHDCI connectors and two internal four-drop single-ended terminated 16-bit SCSI cables for device attachment. Two power supplies and two power cords are also included. Tip: The front rail clips will need to be reversed and screwed in from behind to secure the unit in a 930842X rack.
10. NetMEDIA Systems Management Adapter (P/N 10L7113) may be installed in a 3551001 to provide repeater function, LVDS interface, aggregate cable lengths up to 12M when attached to an LVD SCSI controller, and auto-termination when the 3551001 is powered off. External connector is 0.8mm VHDCI.
11. Black desktop DLT tape enclosure with a 68-pin high density external connector. Requires termination by the tape drive or by installation of 68-pin External Multimode LVD/SE SCSI Terminator (P/N 00N7956).
12. Tape library attributes and prerequisites are located in Appendix B: Tape Library Attributes.
13. A combination data/clean cartridge cleans the drive each time the data cartridge is used.

**Note:** Tape support varies by system depending on internal bay availability, SCSI cabling type, number of cable drops, existence of a RAID controller and availability of a suitable external enclosure. The following general rules should be followed.
a) Tapes are not supported for attachment to RAID controllers.
b) Single-ended (non-LVD) devices may be attached to internal multi-mode terminated cables. The entire SCSI bus will be limited to single-ended operation with a maximum bus speed of Ultra-SCSI.
c) LVD devices attached to single-ended terminated cables will operate in single-ended mode with a maximum bus speed of Ultra-SCSI.

**Internal SCSI Cables and Optional SCSI Adapters**
Most systems support the following SCSI adapters for use with tape. Consult the I/O Options table in the system sections for specific system support. Where tapes are supported internal to the system, the cables which ship with the adapters are supported for tape attachment. Some restrictions may apply based on cable and tape type which are explained in the note above.

| Part Number | Description | Cable Description | External Connector |
|---|---|---|---|
| 02K3454 | PCI Fast/Wide Ultra SCSI Adapter | Four-drop, single-ended terminated, 16-bit | 68-pin high density |
| 19K4646 | PCI Wide Ultra160 SCSI Adapter | Five-drop, multi-mode terminated | 0.8mm VHDCI |
| 36L9636 | Netfinity Two-Drop Internal SCSI Cable | Two-drop, single-ended terminated, 16-bit | - |
| 10K2340 | Media Bay Tray and LVD Cable Kit | Two-drop, multi-mode terminated | - |

# Appendix B: Tape Library Attributes

**SCSI Interface and Cable Legend**
M: Male - External
68: 16-bit, 68-pin High Density connector
0.8: 16-bit, 68-pin Very High Density Connection Interface (VHDCI) 0.8mm connector
SE: Single-ended SCSI
HVD: High Voltage Differential SCSI
LVD: Low Voltage Differential SCSI

| Part Number | Description | SCSI Interface | Form Factor | Terminator Included | External Cables Incl (m) | SCSI Controllers Incl | Data Cartridges std/max | Cleaning Cartridges std | Cartridge Mags std/max | Qty of drives - std/max | Max GB-Native/Compressed | MB/sec - Native/compr.[1] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **DLT Tape Libraries** | | | | | | | | | | | | |
| 3502314 | DLT Tape Library - Tower | SE | Desktop | Y | M68-M68 (3M) | Y | 1/14 | 1 | 2/2 | 1/3 | 490/980 | 5/10 |
| 3502R14 | DLT Tape Library - Rack[2] | SE | 4U Rack | Y | M68-M68 (3M) | Y | 1/14 | 1 | 2/2 | 1/3 | 490/980 | 5/10 |
| 33L4979 | DLT Library Drive Upgrade[3] | SE | - | N | Jumper | N | - | - | - | - | - | 5/10 |
| **3600 Series Tape Libraries** | | | | | | | | | | | | |
| 3600220 | 3600 Series 2/4TB LTO Tape Library (Tower) | LVD | Tower | Y | M68-M0.8 (2M) | N | 1/20 | 1 | 4/4 | 1/2 | 2TB/4TB | 15/30 |
| 3600R20 | 3600 Series 2/4TB LTO Tape Library (Rack) | LVD | 5U Rack | Y | M68-M0.8 (2M) | N | 1/60 | 1 | 4/4 | 1/6[7] | 6TB/12TB[7] | 15/30 |
| 3600LXU | 3600 Series 2-Drive, 20-Cartridge Expander Module[4] | LVD | 5U Rack | Y | M68-M0.8 (2M) | N | 0/20 | 1 | 4/4 | 0/2 | 2TB/4TB | 15/30 |
| 3600109 | 3600 Series 900GB/1.8TB LTO Tape Autoloader[5] | LVD | Tower or 6U Rack | Y | M68-M0.8 (2M) | N | 1/9 | 1 | 1/1 | 1/1 | 900/1.8TB | 15/30 |
| 09N4048 | 3600 Series LTO Drive Upgrade Option[6] | LVD | - | N | Jumper | N | - | - | - | - | - | 15/30 |
| **Magstar Tape Systems** | | | | | | | | | | | | |
| 3570C21 | Magstar MP 3570 Tape Subsystem[8] | HVD | 6U Rack | Y | (4.5M) | Y | 1/20 | 1 | 2/2 | 1/2 | 100/300 | 7/15 |
| 3570C22 | Magstar MP 3570 Tape Subsystem[8] | HVD | 6U Rack | Y | (4.5M) | Y | 1/20 | 1 | 2/2 | 2/2[13] | 100/300 | 7/15 |
| 08L6517 | 3570 Adapter Card Kit[9] | HVD | - | Y | (4.5M) | Y | - | - | - | - | - | - |
| 08L6480 | Second "C" Drive for C21[10] | HVD | - | - | - | N | - | - | - | - | - | 7/15 |
| **Magstar MP Media[11]** | | | | | | | | | | | | |
| 05H2462 | Magstar MP Fast Access Linear Tape Cartridge, B-format[12] | - | - | - | - | - | - | - | - | - | - | - |
| 05H2463 | Magstar MP Cleaning Cartridge | - | - | - | - | - | - | - | - | - | - | - |
| 08L6187 | Magstar MP Fast Access Linear Tape Cartridge, C-format | - | - | - | - | - | - | - | - | - | - | - |

1. Transfer rates are for single SCSI channel configurations. Tape libraries utilizing split library or dual host configurations may obtain higher rates. Data compression typically provides a 2X improvement in capacity and transfer rate, but since data compression is affected by many factors, actual improvements may be more or less than 2X.
2. Includes Fixed Shelf (P/N 94G7442) for installation in an IBM rack or NetBAY22.
3. Upgrade 33L4979 is an additional drive for 3502x14 DLT Tape Libraries. Up to two drive upgrades may be installed for a maximum of three drives per 3502x14.
4. Supported only with the 3600 Series LTO Tape Library (rack) (P/N3600R20). Allow one additional EIA space when installing either one or two (maximum) units to accommodate a filler plate for cable routing. Up to two 3600 Series LTO Drive Upgrade Options can be installed in each module or the module can operate off the LTO drives installed in the LTO tape library.
5. If installed in a rack, a fixed shelf is required. Allow an additional 1U for the fixed shelf. Only one unit is supported per shelf.
6. Install in second drive bay of 3600 Series LTO Tape Libraries or in either of the two bays of 3600 Series 2-drive, 20-cartridge Expander Module to increase performance. Includes an LTO (Ultrium) drive and a one-meter external LVD SCSI cable.
7. Maximum configuration includes two 3600 Series 2-Drive, 20-Cartridge Expander Modules (P/N 3600LXU).
8. Includes rack mounting hardware and two power cords (120V and 250V). Models B22 and C22 include an additional two power cords.
9. Required for Dual Host or Split Library configurations with 3570B2x or 3570C2x containing two drives.
10. Required for either dual host or split library operation. Should be installed by qualified service personnel.
11. Magstar MP Media can be ordered by calling 888-IBM-MEDIA or 888-426-6334 in the US, Canada, or Puerto Rico.
12. B-format tape cartridges can be used in either Magstar MP 3570 Model B or C tape drives.
13. The two tape drives are daisy-chained on the same SCSI bus with an included 0.5m SCSI cable. Dual Host and Split Library configurations require 3570 Adapter Card Kit (P/N 08L6517).

# Appendix C: UPS Runtime Estimate (minutes)

| Servers | # Pwr Cords Std/Max | Watts Load Max/Typ[1] |
|---|---|---|
| xSeries 200[2] | 1/1 | 350/245 |
| xSeries 220[2] | 1/1 | 350/245 |
| xSeries 230 / Netfinity 5100[2] | 1/3 | 450/315 |
| xSeries 232 (one 385W power supply)[2] | 1/1 | 400/280 |
| xSeries 232 (two 250W power supplies)[2] | 2/3 | 450/315 |
| xSeries 240 / Netfinity5600[2] | 2/3 | 450/315 |
| xSeries 250[2] | 2/4 | 475/350 |
| xSeries 300[2] | 1/1 | 200/140 |
| xSeries 330[2] | 1/1 | 200/140 |
| xSeries 340 / Netfinity4500R[2] | 1/2 | 390/270 |
| xSeries 342[2] | 1/2 | 390/270 |
| xSeries 350[2] | 1/3 | 525/365 |
| xSeries 370[2] | 3/3 | 1450/1015 |
| **Other Devices** | | |
| FAStT500 Storage Server (3552)[2] | 2/2 | 200/140 |
| FAStT EXP500 Storage Expansion Unit (3560)[2] | 2/2 | 350/245 |
| FAStT200 Storage Server (35421RU)[2] | 2/2 | 390/275 |
| FAStT200 HA Storage Server (35422RU)[2] | 2/2 | 390/275 |
| EXP300 Storage Expansion Unit (3531)[2] | 2/2 | 360/285 |
| SAN Fibre Channel Switch, 8-port (2109S08) | 1/2 | 200/n/a |
| SAN Fibre Channel Switch, 16-port (2109S16) | 1/2 | 200/n/a |
| SAN Data Gateway Router (Diff.) (2108R3D) | 1/1 | 90/n/a |
| SAN Data Gateway Router (SE) (2108R3S) | 1/1 | 90/n/a |
| DLT Tape Autoloader and Library (3502) | 1/1 | 135/n/a |
| Magstar MP 3570 Tape Subsystem (C2x) | 1/1 | 200/140 |
| NetMEDIA Storage Expansion Unit EL (3551) | 2/2 | 185/130 |

1. This table represents general guidelines for selecting the appropriate UPS based on minimum and typical runtime estimates. A 'maximum configuration' load will result in 'minimum' UPS runtime. 'Typical' loads are based on a production system running at approximately 70% of maximum capacity. The 'typical' loads represent a more likely configuration and is a more likely estimate of runtime. Customer environments are unique and are unlikely to be precisely represented by any of the specific entries in the table.
2. Power-Factor Corrected (PFC) power supply.

| | | Tower | | | | Rack Mounted | | |
|---|---|---|---|---|---|---|---|---|
| | **INT'L P/N** | **SU-700iNET 94G4073** | **SU-1000iNET 94G4074** | **SU-1400iNET 94G4075** | **SU-2200iNET 94G4076** | **SU-1400RMiB 94G6675** | **SU-3000RMiB 94G6677** | **SU-5000RMiB 37L6862** |
| | **US P/N** | **SU-700NET 94G3134** | **SU-1000NET 94G3135** | **SU-1400NET 94G3136** | **Not Available** | **SU-1400RMB 94G6674** | **SU-3000RMB 94G6676** | **SU-5000RMB 37L6861** |
| **UPS Attributes** | | | | | | | | |
| Communications Links to Servers | | 1 | 1 | 1 | 1 | 1 | 3 | 3 |
| Color | | black | black | black | white | black | black | black |
| EIA Height | | - | - | - | - | 3U | 3U | 5U |
| **International Models** | | | | | | | | |
| 50 or 60Hz, single phase, VAC: | | 220-240 (208)[2] | 220-240 (208)[2] | 220-240 (208)[2] | 220-240 (208)[2] | 220-240 (208)[2] | 220-240 (208)[2] | 220-240 (xxx)[2, 3] |
| 10-Amp, IEC 320-C13 (Device) receptacles | | 4 | 4 | 4 | 8 | 4 | 8 | 8 |
| 16-Amp, IEC 320-C19 (PDU 94G7450) receptacles | | - | - | - | 1 | - | 1 | 2 |
| Line Cord Receptacle (IEC 320-) | | C14 | C14 | C20 | C20 | C14 | C20 | TB[5] |
| **US Models** | | | | | | | | |
| 50 or 60Hz, single phase, VAC: | | 120 (120)[2] | 120 (120)[2] | 120 (120)[2] | - | 120 (120)[2] | 120 (120)[2] | 200-220 (208)[2] |
| Receptacles (NEMA 5-15R) | | 4 | 6 | 6 | - | 6 | 8 | - |
| 10-Amp, IEC 320-C13 (Device) receptacles | | - | - | - | - | - | - | 8 |
| 16-Amp, IEC 320-C19 (PDU 94G7450) receptacles | | - | - | - | - | - | - | 2[4] |
| Line Cord Length, NEMA Plug | | 6ft, 5-15P | 6ft, 5-15P | 6ft, 5-15P | - | 6ft, L5-15P | 6ft, L5-30P | 8ft, L6-30P |

1. Data provided by APC.
2. How-to-Read example for 220-240(208): Input VAC is 220-240 as is the UPS output when electric service is active. When electric service is interrupted and the UPS is on battery the UPS output is 208 VAC.
3. Battery output may be set to 220, 225, 230, or 240 VAC.
4. Two PDU jumper cables ship with the UPS for attachment from the IEC 320-C19 receptacles to Power Distribution Units (PDU) (P/N 94G7450).
5. SU-5000RMiB (P/N 37L6862) contains a Terminal Block (TB) for direct attachment to an electrical source by qualified personnel.

| | Total Configuration Runtime Estimator (Time in minutes)[1] | | | | | | |
|---|---|---|---|---|---|---|---|
| | Tower | | | | Rack Mount | | |
| **International Part Number** | **SU-700iNET 94G4073** | **SU-1000iNET 94G4074** | **SU-1400iNET 94G4075** | **SU-2200iNET 94G4076** | **SU-1400RMiB 94G6675** | **SU-3000RMiB 94G6677** | **SU-5000RMiB 37L6862** |
| **United States Part Number** | **SU-700NET 94G3134** | **SU-1000NET 94G3135** | **SU-1400NET 94G3136** | **Not Available** | **SU-1400RMB 94G6674** | **SU-3000RMB 94G6676** | **SU-5000RMB 37L6861** |
| **Total Load (Watts)** | **Runtime Minutes** | **Runtime Minutes** | **Runtime Minutes** | **Runtime Minutes** | **Runtime Minutes** | **Runtime Minutes** | **Runtime Minutes** |
| 200 | 22 | 38 | 62 | 130 | 45 | 104 | 240 |
| 250 | 17 | 28 | 43 | 104 | 34 | 84 | 200 |
| 300 | 12 | 22 | 34 | 85 | 25 | 70 | 166 |
| 350 | 9 | 18 | 29 | 71 | 22 | 58 | 145 |
| 400 | 7 | 14 | 23 | 65 | 18 | 52 | 125 |
| 450 | 5 | 12 | 20 | 52 | 15 | 45 | 110 |
| 500 | - | 11 | 18 | 43 | 13 | 38 | 97 |
| 550 | - | 9 | 16 | 38 | 11 | 35 | 87 |
| 600 | - | 8 | 13 | 34 | 10 | 31 | 76 |
| 650 | - | 7 | 12 | 31 | 9 | 29 | 68 |
| 700 | - | 6 | 11 | 28 | 8 | 26 | 63 |
| 750 | - | - | 10 | 25 | 8 | 24 | 59 |
| 800 | - | - | 9 | 23 | 7 | 22 | 55 |
| 850 | - | - | 8 | 21 | 7 | 20 | 51 |
| 900 | - | - | 7 | 19 | 6 | 18 | 47 |
| 950 | - | - | 6 | 18 | 5 | 17 | 43 |
| 1000 | - | - | - | 17 | - | 16 | 39 |
| 1100 | - | - | - | 15 | - | 14 | 34 |
| 1200 | - | - | - | 13 | - | 12 | 31 |
| 1300 | - | - | - | 11 | - | 10 | 28 |
| 1400 | - | - | - | 9 | - | 9 | 25 |
| 1500 | - | - | - | 9 | - | 8 | 22 |
| 1600 | - | - | - | 8 | - | 8 | 20 |
| 1700 | - | - | - | - | - | 7 | 18 |
| 1800 | - | - | - | - | - | - | 17 |
| 1900 | - | - | - | - | - | - | 14 |
| 2000 | - | - | - | - | - | - | 12 |
| 2100 | - | - | - | - | - | - | 11 |
| 2200 | - | - | - | - | - | | 11 |
| 2300 | - | - | - | - | - | - | 10 |
| 2400 | - | - | - | - | - | | 10 |
| 2500 | - | - | - | - | - | - | 9 |
| 2600 | - | - | - | - | - | | 9 |
| 2700 | - | - | - | - | - | - | 8 |
| 2800 | - | - | - | - | - | - | 8 |

1. Data provided by APC.

Steps:
1. Identify the devices contained in the configuration.
2. Sum the load (watts) of all devices in the configuration. Use either Maximum Load for minimum runtime or Typical Load for typical runtime.
3. Find the Total Configuration Load in the table above.
4. Select the most appropriate UPS model to achieve the desired runtime.
NOTE: If the Total Configuration Load is greater than the entries above, split the load across two or more UPS units.

# Appendix D: SCSI Cables - Storage Units - Controllers

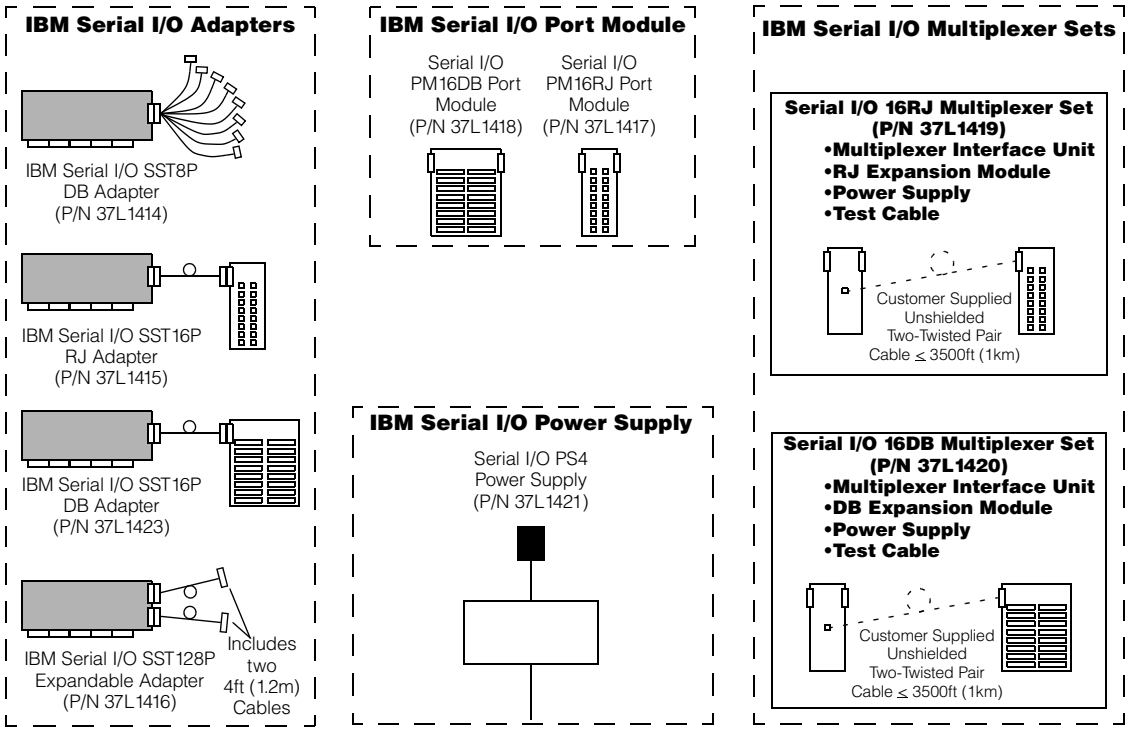
F: Female - External
M: Male - External
I: Internal
68: 16-bit, 68-pin High Density connector
50: 8-bit, 50-pin Centronix Connector
0.8: 16-bit, 68-pin Very High Density Connection Interface (VHDCI) 0.8mm connector
16: 16-bit, 68-pin connector
8: 8-bit, 50-pin connector

Instructions: Identify Desired Controller Row and Storage Unit Column. The intersection of row and column contains the cable group letter which supports the connection. Go to the cable group under the corresponding storage unit for specific support. Read all Notes for row, column, and any cable group footnotes.

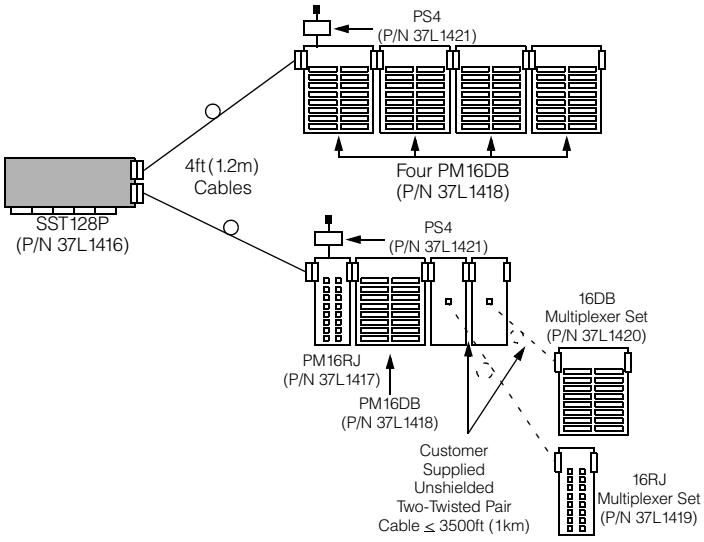
| | Storage Unit | 35311RU | 3510020 | 3503B0X | 3551001 | Adapter 10L7113 | 3600x20 |
|---|---|---|---|---|---|---|---|
| | Max MB/sec.[1] | 160 | - | - | - | - | 30 |
| | LVDS | X | - | - | - | - | X |
| | Connector Type | F0.8 | F68 or F50 | F68 | F0.8 | F0.8 | F68 |
| **Description** | **Part Number** | **Max/ Channel (MB/sec)[1]** | **LVDS** | **Connector Type/ Max** | **Note #** | 2, 3 | 4 | 4, 6 | 2, 4 | 2, 4, 7 | 2, 3, 5 |
| **RAID Storage Controllers** | | | | | | | | | | | |
| ServeRAID-4L Ultra160 SCSI Controller | 37L6091 | 160 | X | F0.8/1 | 9 | A | - | - | - | - | - |
| ServeRAID-4M Ultra160 SCSI Controller | 37L6080 | 160 | X | F0.8/2 | 9 | A | - | - | - | - | - |
| ServeRAID-4H Ultra160 SCSI Controller | 37L6889 | 160 | X | F0.8/4 | 9 | A | - | - | - | - | - |
| ServeRAID-4Mx Ultra160 SCSI Adapter | 06P5736 | 160 | X | F0.8/2 | 9 | A | - | - | - | - | - |
| ServeRAID-4Lx Ultra160 SCSI Adapter II | 06P5740 | 160 | X | F0.8/1 | 9 | A | - | - | - | - | - |
| **Ultra160 SCSI Controllers** | | | | | | | | | | | |
| PCI Wide Ultra160 SCSI Adapter | 19K4646 | 160 | X | F0.8/1 | - | - | - | B | A | A | B |
| Netfinity 6000R - Ultra160 SCSI | Onboard | 160 | X | F0.8/1 | - | - | - | - | A | A | B |
| **Ultra2 SCSI Controllers** | | | | | | | | | | | |
| xSeries 240 / Netfinity 5600 | Onboard | 80 | X | F0.8/1 | - | - | B | B | A | A | B |
| xSeries 250 | Onboard | 80 | X | F0.8/1 | - | - | B | B | A | A | B |
| xSeries 370 | Onboard | 80 | X | F0.8/1 | - | - | B | B | A | A | B |
| **Ultra SCSI Controllers** | | | | | | | | | | | |
| PCI Fast/Wide Ultra SCSI Adapter | 02K3454 | 40 | - | F68/1 | - | - | C | C | B | B | - |
| **No Onboard External Port[12]** | | | | | | | | | | | |
| xSeries 200 | Onboard | - | - | n/a | | - | - | - | - | - | - |
| xSeries 220 | Onboard | - | - | n/a | | - | - | - | - | - | - |
| xSeries 300 | Onboard | - | - | n/a | | - | - | - | - | - | - |
| xSeries 330 | Onboard | - | - | n/a | | - | - | - | - | - | - |
| xSeries 340 / Netfinity 4500R | Onboard | - | - | n/a | | - | - | - | - | - | - |
| xSeries 342 | Onboard | - | - | n/a | | - | - | - | - | - | - |
| xSeries 230 / Netfinity 5100 | Onboard | - | - | n/a | | - | - | - | - | - | - |
| xSeries 232 | Onboard | - | - | n/a | | - | - | - | - | - | - |
| **Cable Group A (M0.8-M0.8)** | | | | | | | | | | | |
| Netfinity 2M Ultra2 SCSI Cable | 03K9310 | - | X | M0.8-M0.8 | 10 | X[11] | - | - | X | X | - |
| Netfinity 4.2M Ultra2 SCSI Cable | 03K9311 | - | X | M0.8-M0.8 | 10 | X | - | - | X | X | - |
| Netfinity 20M Ultra2 SCSI Cable | 37L7101 | - | X | M0.8-M0.8 | 8 | X | - | - | - | - | - |
| **Cable Group B (M68-M0.8)** | | | | | | | | | | | |
| 2M External 0.8mm SCSI Cable | 01K8027 | - | - | M68-M0.8 | - | - | X | X | X | X | X[5] |
| **Cable Group C (M68-M68)** | | | | | | | | | | | |
| PC Server F/W to F/W External SCSI Cable - 1m | 70G9857 | - | - | M68-M68 | 13 | - | X | X | - | - | - |
| **Cable Group G (Other)** | | | | | | | | | | | |
| 68-pin External Multimode LVD/SE SCSI Terminator | 00N7956 | - | - | M68 | | - | X | X | - | - | - |

1. Maximum supported speeds may be limited by installation of lower speed devices, controllers or cable lengths greater than two meters.
2. Rack installation cable management requires devices to have a minimum cable length of two meters. Cable length requirements will vary based on placement within a single or multiple rack suite.
3. Maximum speeds may be limited by the installed devices or SCSI controller.
4. Daisy chaining tape enclosures is not supported at this time.
5. The 3600 Series Tape Libraries (rack or tower) support up to two Expander Modules (P/N 3600LXU). 3600 Series Tape Libraries and Expander Module are shipped with a 2M M68-M0.8 external SCSI Cable (P/N 01K8027).
6. Requires 68-pin External Multimode LVD/SE SCSI Terminator (P/N 00N7956).
7. NetMEDIA Systems Management Adapter (P/N 10L7113) may be installed in a 3551001 to provide repeater function, LVDS interface, aggregate cable lengths up to 12 meters when attached to an LVD SCSI controller, and auto-termination when the 3551001 is powered off. External connector is 0.8mm VHDCI.
8. Cable lengths exceeding 4.3 meters are NOT supported for attachment to non-Ultra2 or Ultra160 controllers.
9. Maximum speeds may be limited by the enclosure or its installed devices.
10. Supports attachment to Ultra2 or single-ended SCSI controllers with operational speeds of up to Ultra2. Controller, storage unit, cable length or storage device limitations may apply (see Max MB/sec row and column above).
11. EXP300 (P/N 35311RU) includes a single 2M Ultra2 SCSI cable similar to Netfinity 2M Ultra2 SCSI Cable (P/N 03K9310).
12. No external SCSI port is available on these systems. A supported optional controller must be installed. See the systems section to determine which controllers and external storage units are supported then refer back to this table for cable requirements using the controller row.
13. Not supported for use in a rack. Rack installations require a minimum cable length of two meters.

# Appendix E: IBM Serial I/O


IBM Serial I/O Adapters
IBM Serial I/O SST8P DB Adapter (P/N 37L1414)
IBM Serial I/O SST16P RJ Adapter (P/N 37L1415)
IBM Serial I/O SST16P DB Adapter (P/N 37L1423)
IBM Serial I/O SST128P Expandable Adapter (P/N 37L1416)
Includes two 4ft (1.2m) Cables
IBM Serial I/O Port Module
Serial I/O PM16DB Port Module (P/N 37L1418)
Serial I/O PM16RJ Port Module (P/N 37L1417)
IBM Serial I/O Power Supply
Serial I/O PS4 Power Supply (P/N 37L1421)
IBM Serial I/O Multiplexer Sets
Serial I/O 16RJ Multiplexer Set (P/N 37L1419)
•Multiplexer Interface Unit
•RJ Expansion Module
•Power Supply
•Test Cable
Customer Supplied Unshielded Two-Twisted Pair Cable ≤ 3500ft (1km)
Serial I/O 16DB Multiplexer Set (P/N 37L1420)
•Multiplexer Interface Unit
•DB Expansion Module
•Power Supply
•Test Cable
Customer Supplied Unshielded Two-Twisted Pair Cable ≤ 3500ft (1km)

## Sample Configurations


PS4 (P/N 37L1421)
4ft (1.2m) Cables
Four PM16DB (P/N 37L1418)
SST128P (P/N 37L1416)
PS4 (P/N 37L1421)
16DB Multiplexer Set (P/N 37L1420)
PM16RJ (P/N 37L1417)
PM16DB (P/N 37L1418)
Customer Supplied Unshielded Two-Twisted Pair Cable ≤ 3500ft (1km)
16RJ Multiplexer Set (P/N 37L1419)

| | |
|---|---|
| 37L1414 | Serial I/O SST8P DB Adapter[1, 6] |
| 37L1415 | Serial I/O SST16P RJ Adapter[2, 6] |
| 37L1423 | Serial I/O SST16P DB Adapter[3, 6] |
| 37L1416 | Serial I/O SST128P Expandable Adapter[4, 6] |
| 37L1417 | Serial I/O PM16RJ Port Module[5] |
| 37L1418 | Serial I/O PM16DB Port Module[5] |
| 37L1419 | Serial I/O 16RJ Multiplexer Set[5, 7] |
| 37L1420 | Serial I/O 16DB Multiplexer Set[5, 7] |
| 37L1421 | Serial I/O PS4 Power Supply[5] |

(1) Intelligent serial I/O interface card providing eight DB-25 RS232 serial connections using an octopus cable. Support for all ports at 921.6Kbps simultaneously.
(2) Intelligent serial I/O interface card providing sixteen RJ-45 RS232 serial connections in a breakout box. Support for all ports at 115.2Kbps simultaneously.
(3) Intelligent serial I/O interface card providing sixteen DB-25 RS232 serial connections in a breakout box. Support for all ports at 115.2Kbps simultaneously.
(4) Intelligent interface card providing up to 128 RS232 serial connections (DB25 or RJ45) configured in 16-port increments utilizing any combination of Port Modules and Multiplexer Sets. Includes two 4ft (1.2m) bus cables. Each 4ft cable supports attachment of one to four Port Modules and/or Multiplexer Interface Units for a total of eight per adapter. The first Port Module or Multiplexer Set attached to a cable requires a Serial I/O PS4 Power Supply (P/N 37L1421). Support for all ports at 115.2Kbps simultaneously.
(5) Port Modules and Multiplexer Sets attach directly to one of the two standard 4ft (1.2m) bus cables of the Serial I/O SST128P Expandable Adapter (P/N 37L1416) or directly to one or more Port Modules or Multiplexer Sets already attached to one of the cables. A maximum of four Port Modules or Multiplexer Sets may be attached to a single cable. The first Port Module or Multiplexer Set attached to a cable requires a Serial I/O PS4 Power Supply (P/N 37L1421).
(6) Serial I/O Adapters are 32-bit PCI half length cards. A maximum of four Serial I/O adapters (in any combination) may be installed in a single host system.
(7) Requires a customer supplied Unshielded Two-Twisted Pair (Category 3 minimum) cable with a maximum length of 3,500ft (1Km).

# Important Notes

IBM reserves the right to change product specifications and to discontinue marketing products without notice.
*MHz only measures microprocessor internal clock speed, not application performance. Many factors affect application performance.
**When referring to storage capacity, GB stands for one billion bytes.Total user-accessible capacity may be less.
***The quotation function within OrderBUILDER allows reseller specific pricing to be included.
****Tape Drives which utilize data compression technology have storage capacity that will vary depending upon whether the drive is operating in native mode (without compression) or compressed mode. Actual storage capacity will vary based upon many factors and may be less than the maximum possible.
Maximum internal hard disk drive capacities assume the replacement of any hard disk drives and the population of all hard disk drive bays with the largest currently supported drives available from IBM.
The information contained in this document has not been submitted to any formal IBM test and is distributed AS IS. The use of this information or the implementation of any of these techniques is a customer responsibility and depends on the customer's ability to evaluate and integrate them into the customer's operational environment. While each item may have been reviewed by IBM for accuracy in a specific situation, there is no guarantee that the same or similar results will be obtained elsewhere. Customers attempting to adapt these techniques to their own environments do so at their own risk.
For more information on IBM's statement of Limited Warranty, please call 1-800-772-2227 in the United States, 1-800-426-2255 in Canada, or contact your IBM representative or reseller. Copies are available upon request. For warranties including onsite service, a technician is sent after IBM attempts to resolve the problem remotely.
Energy Star compliance: The EPA, as a matter of policy, does not endorse any particular company or its products.
IBM makes no representations or warranties with respect to non-IBM products. Support (if any) for the non-IBM products is provided by the third party, not IBM. IBM makes no warranties, express or implied, regarding non-IBM products and services that are ServerProven, including but not limited to the implied warranties of merchantability and fitness for particular purpose. These products are offered and warranted solely by third parties.
Unless otherwise noted, phone numbers and fax numbers are valid only in the United States. Outside the United States, please call your local IBM representative for assistance.
Applications included in IBM products may vary from retail versions and may not include all documentation or functions. Not all products are sold separately. Third-party software licenses may apply.
This publication was produced in the United States. IBM may not offer the products, services or features discussed in this document in other countries, and the information is subject to change without notice. Consult your local IBM representative for more information on the products, services and features available in your area.

©IBM Server Group
3039 Cornwallis Rd.
Research Triangle Park, NC 27709

All the part numbers referenced in this publication are product part numbers and not service part numbers.
This publication could contain technical inaccuracies or typographical errors. Changes are periodically made to the information herein; these changes will be incorporated in new editions of this publication. IBM may make improvements and/or changes in the product(s) and/or program(s) described in this publication at any time. IBM reserves the right to alter specifications and other product information without notice. It is your responsibility to obtain the latest information.
Other part numbers in addition to those listed in this document may be required to support a specific device or function.
Data on competitive products is obtained from publicly obtained information and is subject to change without notice. Please contact the manufacturer for the most recent information.
This IBM equipment is subject to applicable rules and regulations of the United States Federal Communication Commission (FCC).
The following items are trademarks or registered trademarks of IBM Corporation in the United States or other countries or both: IBM, the IBM logo, Active PCI, Alert on LAN, Chipkill memory, the e-business logo, ESCON, IntelliStation, LANStreamer, Light Path Diagnostics, NetBAY3, NetBAY3E, NetBAY22, Netfinity, OS/2, Predictive Failure Analysis, ServeRAID, ServerGuide, ServerProven, SurePath, TechConnect, Wake on LAN, xSeries, 800-CALL-IBM.
TME 10 Netfinity is a trademark of Tivoli Systems, an IBM Company. Lotus, Lotus Notes and Lotus SmartSuite are trademarks of Lotus Development Corporation.
Intel, Pentium, Celeron, Itanium, MMX, and Pentium III Xeon are trademarks or registered trademarks of Intel Corporation. Microsoft, Windows and Windows NT are trademarks or registered trademarks of the Microsoft Corporation. UNIX is a registered trademark in the United States and other countries or registered trademarks licensed exclusively through X/Open Company Limited. Trinitron is a trademark of the Sony Corporation. Java and all Java-based trademarks and logos are trademarks or registered trademarks of Sun Microsystems, Inc. in the U.S. and/or other countries. All other registered trademarks and trademarks are properties of their respective owners.

© Copyright IBM Corporation 2001

IBM Server Group
3039 Cornwallis Road
Research Triangle Park, NC 27709